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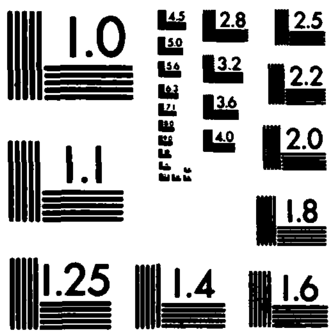
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FEASIBILITY STUDY FOR AN AIR FORCE ENVIRONMENTAL MODEL AND DATA EXCHANGE

Volume II Appendices B - E: Air Force Needs and Capabilities Survey

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AUGUST 1983

FINAL REPORT
MARCH 1981 - FEBRUARY 1983

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The study assesses Air Force needs and capabilities for environmental consequence modeling, Air Force model application capabilities, and proposes resources available to overcome identified deficiencies. Needs for environmental information and analytical techniques were studied, and strategies proposed by which the modeling capabilities could evolve toward a comprehensive environmental information network, user community, and data exchange. The recommended information network would be known as the Air Force Environmental Model and Data Exchange (AFEMDEX). The technical report consists of four volumes. (continued)

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Volume 1: MODEL AND DATA REQUIREMENTS WITH RECOMMENDATIONS. The study recommends evolution of a computer-based network to enhance Air Force access and exchange of environmental information, and to match models with required data sources for effective application. The AFEMDEX network development is proposed in three evolutionary stages: (1) coordination; (2) information exchange; and (3) networking. Coordination would involve linking existing Air Force modeling needs to existing modeling resources in the Air Force and elsewhere, plus establishing a network of model support and use centers for operational modeling. Information exchange would involve developing techniques for transporting model data, analytical techniques and computer software from one model center to another, and promoting the distribution of coordinated hardware for a distributed network of model support centers. Network application involves the full linkage of distributed modeling computers into an integrated network. Other Air Force environmental information needs that could be addressed by AFEMDEX include: a hazardous chemical information system with chemical auditing, tracking, and disposal and accident planning; an improved environmental law information system; improved techniques for environmental data capture, storage, transportation, formatting, management and interpretation; computer cartography and site design aids; management information systems for facility planning, construction and operation; and a computer bibliographic reference database for environmental literature of special interest to the Air Force.

Volume 2: AIR FORCE NEEDS AND CAPABILITIES SURVEY. The survey instrument, survey results, and result analyses which constituted the Air Force needs and capabilities fact-finding task are presented. Air Force agencies which require, or desire environmental information or model application were surveyed to define operational needs and capabilities. Evaluation of present Air Force capabilities, plus capabilities of other federal agencies available to the Air Force, is discussed. A listing of existing environmental models which may be applicable to satisfying mission needs, with a preference rating, is presented.

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Volume 3: MODEL REVIEW AND INDEX - WATER MODELS. A brief introduction to water models, by application category, precedes an extensive directory of water quality and quantity models. Reviews of models presented include (in general): (1) model name; (2) sponsor/developer; (3) contact; (4) model availability; (5) model abstract; (6) citation references; (7) current user; (8) implementation hardware/software; (9) input requirements; (10) output products; (11) synopsis of major parameters.

Volume 4: MODEL REVIEW AND INDEX - AIR, MULTIMEDIA AND OTHER MODELS, PLUS DATABASES. A brief introduction to air models, by application category, precedes an extensive directory of air quality models. The directory further provides reviews of multimedia, geology and soil, ecology, socioeconomic, exposure, noise, waste disposal, chemical spill, and traffic models. Further, a brief introduction to databases is followed by reviews for water, air, chemical and noise databases. Reviews of models presented include (in general): (1) model name; (2) sponsor/developer; (3) contact; (4) model availability; (5) model abstract; (6) citation references; (7) current user; (8) implementation hardware/software; (9) input requirements; (10) output products; (11) synopsis of major parameters.

B

PREFACE

This report was prepared by General Software Corporation, 8401 Corporate Drive, Landover, Maryland, 20785 under subcontract from M/A-COM Sigma Data Computing Corp., 5515 Security Lane, Rockville, Maryland 20852 under Contract No. WQ1Y03, Task 6, with HQ AFESC/RDV, Tyndall Air Force Base, Florida 32403.

This report documents work performed between March 1981 and February 1983. Dr. Carol Graves of Sigma Data Computing Corp., was the Project Officer for the IAG with the President's Council on Environmental Quality. Mr. John Ficke was the Project Officer for the IAG with the President's Council on Environmental Quality. Mr. Larry Milask was the Project Manager and Mr. Stewart McKenzie the primary author for the IAG with General Software Corporation. Captains George W. Schlossnagle, and Glenn E. Tapio were Project Officers for the Air Force Engineering and Services Center (AFESC/RDVS).

The authors wish to thank the Air Force personnel who participated in the questionnaire/survey and gave valuable comments and suggestions which enabled this feasibility study to accurately reflect the USAF capabilities and needs.

This report has been reviewed by the Public Affairs Office (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nationals.

This technical report has been reviewed and is approved for publication.

GLENN E. TAPIO, Capt, USAF
Project Officer

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Director, Engineering and Services Laboratory

MICHAEL J. RYAN, Lt Col, USAF, BSC
Chief, Environics Division

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APPENDIX B

MODELING NEEDS - RESOURCES

SECTION I

INTRODUCTION

In this feasibility study a detailed analysis was made to link the environmental analysis features either required or desired by Air Force Groups with the analytical features of the 200-odd models selected for cataloging and further preference analysis.

The user-need questionnaire included sections on analytical features needed for studies of air, water, noise, and chemical spills. Questionnaires were summarized by group to identify the environmental analysis features which are mandatory or desired for the missions of each group (Table 1). The analytical features required by each group were compared with the capabilities of each model and a degree of fit between the two was measured. These are shown in the left-hand columns of Table 2.

The number of groups having needs satisfied by each model was then combined with the degree-of-fit of the model for each group, the technical quality of the model, and the potential of the model to run on microcomputers to produce a composite number. The numbers that form the composite, the composite totals, and the model rank order are shown in the right-hand columns of Table 2. Details of this ranking analysis are discussed in Section III of this Appendix.

The composite numbers were studied for clustering. The larger groups of models, air and water were arranged as histograms to assist the process. From this study, a cutoff number was selected, which fell between model clusters and produced about 100 models for a preliminary Air Force "most preferred models" list to be included in the main report.

Figures 1 and 2 show the composite number histograms. The most preferred models are listed in Table 5 of the main report.

SECTION II

ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS

The needs survey questionnaire asked detailed questions about environmental analysis features needed for Air Force missions.

Environmental studies were grouped by function: air, surface water, or noise, for example. Detailed analysis features were listed within each group: capability to analyze reactive air pollutants, capability to analyze large watershed, or capability to analyze specific aircraft noise, for example. Each respondent was asked to note whether each analysis feature was mandatory or desirable for the respondent's mission. Answers were summarized by the Air Force group to produce a profile of environmental analysis needs for each Air Force group surveyed. Table 1 shows this summary of analysis needs.

TABLE B-1. ENVIRONMENTAL ANALYSIS NEEDED BY AIR FORCE GROUPS

AIR QUALITY

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEN
SIMPLE TOPOGRAPHY	M	D			M	M D	M D	M			D													D					M			D		D
VERTICAL DISPERSION OF POLLUTANTS	M D				M	M D	M D	D			D										D		D	M				M	D			D		D
CROSS WIND DISPERSION OF POLLUTANTS	M				M	M D	M D	D			D										D		D	M				M	D			D		D
MULTIELEMENT INTERACTIVE MODELS	M D					M D	D	M			D										D			M				M	D			D		D
SINGLE ELEMENT MODELING	M D				M	M D	D	M			D										D			D				M	M					D
MULTIPLE POLLUTANT INTRODUCTIONS	M D					M D	D	M			D										D							M	D					D
REGIONAL AND SUBCONTINENTAL ELEMENTS	M					M D	D																											
LOCALIZED PROJECT ELEMENTS	M				M	M D	D	M													D													D
TIME SCALE: HOURS	M D	D			M	M D	M D	M																M				M	M					D
TIME SCALE: DAYS	M D	D			M	M D	D	M																M					M					D
TIME SCALE: YEARS	M D				M	D	D	M													D			M					M					D

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONTINUED)

AIR QUALITY

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEM
REACTIVE POLLUTANT CAPABILITIES	M					M	M	M										M											M					
	D						D				D										D			D										D
NONREACTIVE POLLUTANT CAPABILITIES	M				M	M	M	M										M																
	D					D	D				D										D			D					D					D
PHYSICAL LOSS OF ELEMENTS COMMUTATION (SCAVENGING, SURFACE/ DECOMPOSITION, RAINOUT)	M																																	
	D						D														D											D		D
VARIATION OF WIND SPEED (SPACE AND TIME)	M				M	M	M											M										M	M			M		
		D					D	D	D		D										D		D											D
VARIATION OF WIND SPEED (SPACE AND TIME)	M				M	M	M											M										M	M			M		
		D					D	D	D		D										D		D											D
VARIATION OF INVERSION BASE HEIGHT (SPACE AND TIME)	M				M	M	M											M										M						
							D	D			D										D		D						D			D		D
VARIATION OF REACTIVE POLLUTANTS (SPACE AND TIME)	M					M												M																
	D						D	D			D												D	D					D					D
VARIATION OF INCIDENT SUNLIGHT (SPACE AND TIME)	M				M																							M	M					
	D						D	D													D											D		D
POINT SOURCES	M				M	M	M	M															M					M	M					
	D					D	D				D							D			D			D								D		D
LINEAR SOURCES	M				M	M	M	M																				M	M					
	D					D	D				D							D																D
AREA SOURCES	M				M	M	M	M																				M	M					
						D	D				D							D			D			D								D		D
COMPLEX TOPOGRAPHY	M				M																													
	D					D	D				D													D					D					D

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONTINUED)

CHEMICAL SPILLS

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEN
CAPABILITY TO ANALYZE LAND SURFACE SPILLS	M						M	M			D							M	D		D		D	D					M					D
CAPABILITY TO ANALYZE WATER SPILLS	M D							M			D							M	D		D		D	D					M					D
CAPABILITY TO ANALYZE FLAMMABLE MATERIAL SPILLS	M					D	D	M			D												D	D					M			D		D
CAPABILITY TO ANALYZE OIL SPILLS	M						D	M			D							M	D		D		D	D					M					D
CAPABILITY TO ANALYZE TOXIC CHEMICAL SPILLS	M D					D	M D	M			D							M	D		D		D	D					D					D

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONTINUED)

GROUNDWATER

M = Mandatory Analysis Feature

D = Desired Analysis Feature

GROUNDWATER	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEM
ANALYTIC SOLUTION (EXACT)	M D					M	D	M			D								D										D					D
NUMERIC SOLUTION (FINITE ELEMENT)	M D					M	D	M			D																		D					D
STEADY-STATE CONDITIONS	M D					D	D	M			D																		M					D
UNSTEADY-STATE CONDITIONS	M D					D	D	M			D																		D					D
SINGLE LAYER MODULE (ONE AQUIFER)	M						D	M			D							D						D					M					D
MULTILAYER MODULES WITH LEAKAGE BETWEEN LAYERS	M						D	M			D																		D					D
CAPABILITY TO ANALYZE SEMIPERMEABLE AND NONPERMEABLE AQUIFER	M						D	M			D													D					D					D
CAPABILITY TO SIMULATE STREAM AQUIFER INTERACTION	M						D	M			D																		D					D
CAPABILITY TO SIMULATE UNSATURATED ELEMENT	M						D	M			D																		M					D
CAPABILITY TO SIMULATE SATURATED ELEMENT	M						D	M			D																		M					D
CAPABILITY TO INPUT VARIABLE FLOW RATE BOUNDARY	M						D	M			D																		M					D
CAPABILITY TO INPUT HEAD DIFFERENTIALS ACROSS ELEMENT	M						D	M			D																		D					

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONTINUED)

HYDROLOGY

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEM
CAPABILITY TO ANALYZE SMALL WATERSHED AREAS	D	M				D		M			D								D					D					D					
CAPABILITY TO ANALYZE LARGE WATERSHED AREAS	D	M				D		M											D					M D					D					
CAPABILITY TO ANALYZE RURAL LAND AREA		M						M											D					D					D					
CAPABILITY TO ANALYZE URBAN LAND AREA		D						M											D					D					M					
CAPABILITY TO GENERATE ENTIRE HYDROGRAPH(S)						D		M																D					D					
CAPABILITY TO PERFORM FLOOD ROUTING						D		M											D					D					D					
CAPABILITY TO ANALYZE SNOWMELT CONDITIONS	D					D		M																D										
CAPABILITY TO PERFORM CONTINUOUS SIMULATION OF A STORM EVENT	D					D		M																D										
CAPABILITY TO PERFORM CONTINUOUS SIMULATION IN REAL TIME	D	D				M		M			D													D										
CAPABILITY TO COMPUTE EFFECTS OF SEDIMENTATION AND SCOUR	D							M																D										
CAPABILITY TO RECORD WATER FLOW FROM A SIMULATION	D					D		M																										
CAPABILITY OF AUTOMATIC TIME INTERVAL GENERATION								M																D										
CAPABILITY TO COMPUTE INFILTRATION RATES	D							M																D										

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONTINUED)

AIRCRAFT NOISE

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEM
AIRCRAFT TYPES: WITH JET ENGINES		M				D	M D				D										D		D	M D					M			D		D
AIRCRAFT TYPES: PROPELLER-DRIVEN						D	D														D		D	M D					M					D
AIRCRAFT TYPES: SERIES-SPECIFIC		M				D															D								M			D		D
AIRCRAFT DESCRIPTORS: DETAILED PERFORMANCE, SERIES-SPECIFIC		M				D												D			D		D	D										
AIRCRAFT DESCRIPTORS: POWER VARIATION DURING FLIGHT		M																			D		D	D										
AIRCRAFT DESCRIPTORS: DISPERSION IN-FLIGHT PATHS		M				D	D														D								D					D
AIRCRAFT DESCRIPTORS: VARIATION IN ATMOSPHERIC CONDITIONS		M				D	M				D										D			D								D		D

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONTINUED)

WATER QUALITY

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEM
CAPABILITY TO COMPUTE EFFECT OF	M																												D					
PHOTOSYNTHESIS	D																																	
CAPABILITY TO INCLUDE EFFECT OF	M																	M	M										M					
WASTE TREATMENT PLANT INPUT	D										D									D			D	D								D		
COMPUTE EVAPORATION AND	M																																	
PRECIPITATION EFFECTS	D										D									D			D						D					
TIME VARIANT POLLUTION SOURCES	M																																	
	D					D					D							D		D									D					
POINT SOURCE	M																	M	M				M						M					
	D					D					D							D		D				D								D		
NONPOINT SOURCE	M																	M	M										M					
	D					D					D							D		D			D	D										
STEADY-STATE CONDITIONS	M																												M					
	D					D					D							D		D				D										
UNSTEADY CONDITIONS	M																							M										
	D					D					D							D		D				D					D					
STREAM AND RIVER MODELS	M																												M					
	D					D					D																							
RESERVOIR AND LAKE MODELS	M																												M					
	D					D																												
ESTUARINE MODELS	M																												M					
	D					D																	D											D
OCEAN INLET CAPABILITIES	M																																	
	D																												D					
DAM COMPUTATION CAPABILITIES	M																																	
	D					D																							D					
COMPUTE EFFECTS OF MIXING ZONES	M																																	
	D					D																	D						D			D		

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONTINUED)

WATER QUALITY

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEN
CAPABILITY TO ANALYZE: CARBON-ACEOUS & NITROGENOUS OXYGEN	M																																	
	D										D									D				D										
CAPABILITY TO ANALYZE: WATER TEMPERATURE	M																	M											M					
	D																			D														
CAPABILITY TO ANALYZE: DISSOLVED OXYGEN	M																	M	M										M					
	D										D									D														
CAPABILITY TO ANALYZE: BENTHAL OXYGEN	M																																	
	D										D									D									D					
CAPABILITY TO ANALYZE: PHOSPHOROUS	M																	M						M										
	D										D									D									D					
CAPABILITY TO ANALYZE: COLIFORMS	M																	M	M					M					M					
	D										D									D														
CAPABILITY TO ANALYZE: CHLOROPHYLL-A	M																																	
	D																												D					
CAPABILITY TO ANALYZE: RADIO-ACTIVE CONSTITUENTS	M																	M																
	D										D									D									D					
CAPABILITY TO ANALYZE: SALINITY	M																																	
	D										D									D									D			D		
CAPABILITY TO ANALYZE: CONSERVATIVE MINERALS	M																	M																
	D																			D									D					
TIME DEPENDENT INPUT CONDITIONS	M																												M					
	D					D														D												D		
CAPABILITY TO ANALYZE CHANGES IN CHANNEL FLOW	M																	M											M					
																								D										
CAPABILITY TO COMPUTE EFFECTS OF AERATION	M																		M										M					
	D										D																							
CAPABILITY TO COMPUTE EFFECTS OF RESPIRATION	M																												M					
	D										D																							

TABLE B-1. ENVIRONMENTAL ANALYSIS FEATURES NEEDED BY AIR FORCE GROUPS (CONCLUDED)

NOISE

M = Mandatory Analysis Feature

D = Desired Analysis Feature

	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS									
NOISE	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT AFB/DEV	AFRCE - CR	AFRCE -ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SP/WE (LASPA)	HQ 3WW/DNC	WSMC/SEM
URBAN NOISE SIMULATION		M					D				D													D					D					D
HIGHWAY NOISE SIMULATION		M				D												D						D								D		
CONSTRUCTION NOISE SIMULATION		M				D												D						D								D		D
NOISE MODEL DESCRIPTOR: POINT		M				D	D				D							D			M			M D					M					D
NOISE MODEL DESCRIPTOR: AREA		M				D	D				D							D						D					M					D
NOISE MODEL DESCRIPTOR: NATIONAL EXPOSURE						D	D																											
PLOTTED CONTOURS AS MODEL OUTPUT		M				D	D				D										M D			M					M			D		D
CAPABILITY TO ANALYZE NOISE BARRIERS: LOUDNESS LEVEL		M				D	M D				D							M			M D		D	M					M					D
CAPABILITY TO ANALYZE NOISE BARRIERS: A-WEIGHTED LEVELS		M					D				D							M			M D		D	M					M			D		D
CAPABILITY TO ANALYZE NOISE BARRIERS: OTHER																					M													

SECTION III

FIT BETWEEN ANALYSIS NEEDS AND MODELING CAPABILITIES

A general understanding of Air Force needs was used in the first screening of thousands of available models to produce a short list of about 200 promising models. These models meet some or all of the following criteria:

-- In general Air Force need area
-- Operational
-- Documented
-- Validated
-- Transportable

Desired features which could lower standards on the first list were:

-- Simplicity
-- User-friendliness of software
-- Capacity to run on small computers

Some Air Force need areas are so urgent that lower standards on the first list could be acceptable. These are:

-- Toxic chemical hazards
-- Groundwater studies
-- Heavier-than-air gas modeling
-- Low-dose risk assessment

Models were selected primarily from the following catalogs.

-- Environmental Protection Agency (EPA) Environmental Data Bases and Models Index Draft Directory

-- Society for Computer Applications in Engineering, Planning and Architecture (CEPA) Library of Program Abstracts, 1980

-- Oak Ridge National Laboratory (ORNL) Inventory of Data Bases, Graphics Packages and Models in Department of Energy Laboratories, 1978

-- Digital Equipment Corporation (DEC) Engineering Systems Software Referral Catalog, 1981

-- American Consulting Engineers Council (ACEC) Software and Hardware Catalog

-- Holcomb Research Institute, Butler University Ground Water Modeling Catalog, 1981

The following data bases also have model citations which were used for reference: AGRICOLA (National Agriculture Library); APTIC (Air Pollution Technical Information Center; BIOSIS (Biological Abstracts); ENVIRONLINE (Environmental Information Center Line); Environmental Bibliography (Environmental Studies Institute); DIALOG (Oceanic and Pollution Abstracts); HOMS (Hydrological Abstracts); World Meteorological Organization (WMO).

Each of the 200-odd models selected in this first screen was then cataloged. Available summaries, abstracts, and (in many cases) user manuals and systems documentation were collected and studied.

GSC has firsthand operational experience with about 50 of these models from work now in progress for the EPA Office of Toxic Substances (OTS). GSC has integrated about 30 of these models into a user-friendly modeling library for EPA-OTS and has fully integrated about five into UPGRADE, the CEQ-EPA user-friendly data analysis system. This understanding was used to summarize model capabilities in the same analysis feature classes used in the need survey.

A fit analysis was made between the environmental needs of each Air Force group and the capabilities of each model. In each model area (e.g., air, water) the total number of analysis features required or desired was counted from Table B-1. AFESC/DEV, for example, needs or desires 23 of the various air quality analysis features listed in the survey. The number of these needed or desired characteristics provided by each model was then counted and expressed as a percentage of the total number of features needed or desired by each group. The air model AVAP, for example, provides about 80 percent of the mandatory air analysis features and about 60 percent of features desired by AFESC/RDV for air analysis.

These percentages of fit were grouped into four categories:

0 = no fit
1 = < 33% fit
2 = 33 - 66% fit
3 = > 66% fit.

AVAP would, therefore, score 3 for mandatory and 2 for desired on AFESC/RDV air analysis needs. The capabilities of each model were compared to the needs of each group, and one of these four numbers assigned to each combination. These numbers are shown in Table B-2.

For each model the fit numbers for all Air groups were summed for a total fit with mandatory group needs (column 'm' in Table B-2) and desired group needs (column 'd' in Table B-2).

These fit totals were combined with each other, with GSC assigned technical ranks, and with the potential of the model to run on small

computers to produce a composite number for each model in the following way:

C = Composite number
m = Total fit number for mandatory analysis capabilities
d = Total fit number for desired analysis capabilities
t = GSC technical rank
- 3 = outstanding
- 2 = highly recommended
- 1 = recommended

P = Potential to run on microcomputers
- 2 = high potential
- 1 = low potential

Formula for Calculating Composite Numbers

$$C = (2m+d)\ tp$$

Mandatory analysis requirements are considered twice as important as desired requirements; the total mandatory feature fit total is doubled, then added to the desired feature fit total to form a combined fit total. This combined fit total is then multiplied by the technical rank, always either 2 or 3 in this analysis. This emphasizes technically outstanding models which satisfy Air Force needs.

Finally, a multiplier is included which measures the potential of the model to run on small computers. This very strongly emphasizes technically excellent models which satisfy most Air Force needs and could run on small computers (microcomputers or calculators).

Other weightings and combinations could be made with the data supplied in this report to provide other group-model linkages and model rankings. GSC recommends that a useful task in the coordination stage of developing an Air Force modeling network would be the computerization of Appendices D and E of this report and the development of software to allow flexible sorting and combination.

The results of the fit analysis are shown in Table B-2.

The following key describes the categories of responses analyzed in Table B-2, Air Force Group Modeling Need Referenced to Model Capabilities:

KEY:
USAF GROUPS

Numbers in these columns stand for percentages of either mandatory or desired group analytical requirements satisfied by model capabilities. They represent a degree-of-fit between groups and models with 1 low.

TABLE B-2. AIR FORCE GROUP MODELING NEEDS REFERENCED TO MODEL CAPABILITIES.

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
WATER MODELS																
AFRUM	MAND.	2					1		2							1
	DES.	3					3					2				2
AGRUN	MAND.	2							2							2
	DES.	3					2					2				2
ALLWET	MAND.		2						2							
	DES.	2	1				2					1				2
Analytical Frequency Computation	MAND.								1							
	DES.	1														
ARM II	MAND.	2					1									
	DES.	3					2					3				
AT123D	MAND.	3					1		3							2
	DES.	3					2	3			1	3				2
Backwater Analysis Natural Channel	MAND.								3							
	DES.	2					3									2
Backwater and Front-water Curves	MAND.								3							
	DES.	3					3									
Chicago Hydrograph	MAND.		1						3			1				[illegible]
	DES.	2	1				3				2	2				
Cleary Ground Water Flow	MAND.	3					1		3		1					3
	DES.	3					3	3			1	3				2
Cleary Mass Transport	MAND.	3					1		3							3
	DES.	3					2	3			1	3				2
Computer Model 2D Solute	MAND.	3							3							2
	DES.	3					2	3				3				2
DAMS2	MAND.															
	DES.															

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-ER	MMUF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM
WATER MODELS																				
AFRUM	MAND.			1	1													1		
	DES.			1	1		2	1		3										
AGRUN	MAND.			1	1					1										
	DES.			1	1		2	1		2								1		
ALLWET	MAND.																			
	DES.				2					3										
Analytical Frequency Computation	MAND.																			
	DES.									1										
ARM II	MAND.			1	1					1					1					
	DES.			2	2	2			1	3					3			1		
AT123D	MAND.																			
	DES.				1					1										2
Backwater Analysis Natural Channel	MAND.																			
	DES.									3										
Backwater and Front-water Curves	MAND.																			
	DES.									3										
Chicago Hydrograph	MAND.																			
	DES.									3										
Cleary Ground Water Flow	MAND.																			
	DES.				1					1										3
Cleary Mass Transport	MAND.																			
	DES.				1					1										3
Computer Model 2D Solute	MAND.																			
	DES.				1															3
DAMS2	MAND.																			
	DES.																			

MODELS	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
WATER MODELS	8	4	[illegible]	9	[illegible]	[illegible]	?
AFRUM	3	13	3	1	[illegible]	[illegible]	
AGRUN	9	17	2	1	[illegible]	26	
ALLWET	4	13	2	1	42	38	
Analytical Frequency Computation	1	2	2	1	0		
ARM II	10	23	2	1	86	16	
AT123D	3	16	3	1	[illegible]	11	
Backwater Analysis Natural Channel	1	[illegible]	2	1	32	43	
Backwater and Front-water Curves	3	9	2	1	30	44	
Chicago Hydrograph	5	13	2	1	50	36	
Cleary Ground Water Flow	10	20	3	2	240	2	
Cleary Mass Transport	[illegible]	[illegible]	3	2	222	3	
Computer Model 2D Solute	4	[illegible]	3	1	90	14	
DAMS2	3	11	2	1	34	42	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
FEDBAK03	MAND.	3									1					3
	DES.	3					2					3				1
FEMWASTE	MAND.	3							3							3
	DES.	2					2	3				3				2
FEMWATER	MAND.	3					1		3							2
	DES.	2					1	3				3				3
Finite Difference Aquifer	MAND.	3							3							2
	DES.	1					1	3				3				2
Flood Routing	MAND.															2
	DES.											3				3
DAMBRK	MAND.															
	DES.															
Deep Well Disposal	MAND.	3							3							2
	DES.	1					1	3				3				1
DEM	MAND.	3	1				1		1		1					2
	DES.	3	1				2				1	3				2
HIERARCHIAL MODELING	MAND.	3							3							2
	DES.	1					1	3				[illegible]				2
HN	MAND	3	1				1	1	1		1					2
	DES	3	1				2	2				2				1
HSPF	MAND.	3	1				1	1			1					2
	DES.	3	1				2	2	1		1					2
HYDROCOMP	MAND.		2						3							1
	DES.	3	1				2	2			3	1				[illegible]

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEL	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRLSS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	OSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
FEDBAK03	MAND.			1				1		1											10						
	DES.			1			3	1		2								1		1		18	2	1	76	22	
FEMWASTE	MAND.																				9						
	DES.																			3		13	3	1	90	14	
FEMWATER	MAND.																				9						
	DES.			1						1										3		17	3	1	105	9	*
Finite Difference Aquifer	MAND.																				8						
	DES.			1						1										3		13	1	1	28	45	
Flood Routing	MAND.																				7						
	DES.			1						1										3		20	2	3	134	38	*
DAMBRK	MAND.																				4						
	DES.																					10	2	1	26	41	
Deep Well Disposal	MAND.																				8						
	DES.																			3		12	2	1	55	34	
DEM	MAND.			2				1		1											13						
	DES.			1			2	1		2								1				18	2	1	88	15	
HIERARCHIAL MODELING	MAND.																				S						—
	DES.									1										3		13	2	1	58	33	
HN	MAND			2				1		1											13						
	DES			1			2	1		1								1				15	2	1	82	18	
HSPF	MAND.			1				1		1											11						
	DES.			1			2	1		2								1				20	3	1	125	5	*
HYDROCOMP	MAND.																				[illegible]						
	DES.									3												15	2	1	[illegible]	35	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERNECED TO MODEL CAPABILITIES (CONTINUED).

		LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS										RANKING						
MODELS	AIR FORCE GROUPS WITH MODELLING NEEDS	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	OSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
WATER MODELS CONTINUED																																										
DIURNAL	MAND.	3									1					2			1					1												9						
	DES.	3					1					3				1			1			2		2									1		1		16	3		102	11	*
DCRSCH	MAND.		1				1		3																											5						
	DES.	3	1				3				2	2				1								3													15	2	1	50	36	
DOSAG I	MAND.	3														3			2					1												12						
	DES.	3					2				2	3							1			3		3									1		1		18	3	1	126	6	*
Drainage Runoff Analysis	MAND.		2						3															1												6						
	DES.	2	1				2				2	1				2								3													13	2	1	50	36	
SWOPER	MAND.																							1												4						
	DES.											1				2						2		3													12	3	1	50	32	
EPA RR3	MAND.															1			1	1				1												10						
	DES.															1			1	1		2		2									1				14	2	1	58	28	
EPA TLC	MAND.															2			1	1				1												10						
	DES.															1			1	1		2		2									1				15	2	1	70	26	
EFAURA	MAND.															2			1	1				1												11						
	DES.															1			1	1		2		2									1				15	2	1	74	23	
ES001	MAND.	3									1					3			1					0												9						
	DES.	3					1					3				1			1			3		2									1		1		17	2	1	70	26	
EXPLORE I	MAND.	3									1					2			1					1												9						
	DES.	3					2					2				2			1			2		1									1		1		16	2	1	68	26	*
EZRAT	MAND.																																			0						
	DES.																																				0	2	1	0	0	
FEDIGW	MAND.	3					1		3							2																				9						
	DES.	2					1	3				3				3			1					2											3		18	2	1	72	25	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
WATER MODELS CONTINUED																
FLOOD ROUTING BY MUSKINGHAM	MAND.	0	1						3							
	DES.	2	1				3					2				2
GWMTM 1	MAND.	3					1		3							3
	DES.	3					2	3			1	3				2
GWMTM 2	MAND.	3					1		3							3
	DES.	2					1	3			1	3				2
GSWIM	MAND.	3							3							2
	DES.	2					2	3				3				3
HARO3	MAND.	3									1					2
	DES.	3					2					2				1
HEC 1 (Flood Hydrograph)	MAND.		1						3							
	DES.	3					3				1	1				2
HEC 2 (Surface water profs)	MAND.		1						3		1	1				
	DES.	2									1	1				2
HEC 4 (Monthly Stream Flow)	MAND.															
	DES.															
HEC Support DS HEC	MAND.															
	DES.															
HEC Support REORDR	MAND.															
	DES.															
HEC Support HEC 2 PUNCH	MAND.		1						3		1	1				
	DES.	2					3				1	1				2
HEC Support	MAND.															
	DES.															

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-ER	MMCF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DELV	HQ SD/WE	HQ 3WW/DNC	WSMC/SLM	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	OSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
WATER MODELS CONTINUED																											
FLOOD ROUTING BY MUSKINGHAM	MAND.																				4						
	DES.									3												13	2	1	-2	38	
GWMTM 1	MAND.																				10						
	DES.			1						1										3		19	2	1	78	21	
GWMTM 2	MAND.																				10						
	DES.			1						1										3		17	2	1	74	24	
GSWIM	MAND.																				3						*
	DES.			1						1										3		18	3	1	102	11	
HARO3	MAND.			2					1	1											10						
	DES.			1		2			1	1								1		1		15	2	1	70	26	
HEC 1 (Flood Hydrograph)	MAND.									1											5						
	DES.									3												13	3	1	69	27	
HEC 2 (Surface water profs)	MAND.																				6						
	DES.									3												12	3	1	36	41	
HEC 4 (Monthly Stream Flow)	MAND.																				0						
	DES.																					0	1	2	0	/	
HEC Support DS HEC	MAND.																				0						
	DES.																					0	2	1	0	/	
HEC Support REORDR	MAND.																				0						
	DES.																					0	2	1	0	/	
HEC Support HEC 2 PUNCH	MAND.																				6						
	DES.									3												12	2	1	-8	37	
HEC Support	MAND.																				0						
	DES.																					0	2	1	0	/	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

Laboratories and Special Centers / Headquarters Major Commands

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
WATER MODELS CONTINUED																
ISOQUAD	MAND.	3					1		3							2
	DES.	3					2	3				3				1
ISOQUAD 2	MAND.	3					1		3							3
	DES.	3					2	3				3				3
LEVEL III RECEIVING WATER	MAND.	3									2					3
	DES.	3					1					3				1
LOG PEARSON GAGED STREAMS	MAND.															
	DES.															
LOG PEARSON REGIONAL ANALYSIS	MAND.															
	DES.															
MAGSUM	MAND.	3					1		3							
	DES.	3					2	3				3				2
MAGNUM 3D	MAND.	3							3							3
	DES.	2					1	3				3				2
MIT Transient Water Quality	MAND.	3	1				1		1			1				2
	DES.	3	1				2					1	3			1
WRT-DPRW	MAND.	3							3							3
	DES.	3					2	3				3				1
Multipurpose	MAND.	3							3							3
	DES.							3				3				
Normal and Critical Channels	MAND.		1						3							1
	DES.	3	1				3				2					1
NFS	MAND.	2	1				1		2		1					1
	DES.	3	1				2				1	2				2

Air Force Bases / Other Air Force Groups

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRLSS	AD/DELV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM
WATER MODELS CONTINUED																				
ISOQUAD	MAND.																			
	DES.			1						2										3
ISOQUAD 2	MAND.																			
	DES.			1						1										3
LEVEL III RECEIVING WATER	MAND.			2					1	1										
	DES.			1			3		1	1								1		
LOG PEARSON GAGED STREAMS	MAND.																			
	DES.																			
LOG PEARSON REGIONAL ANALYSIS	MAND.																			
	DES.																			
MAGSUM	MAND.																			
	DES.			1						1										3
MAGNUM 3D	MAND.																			
	DES.			1						1										3
MIT Transient Water Quality	MAND.			2					1	1										
	DES.			1			2		1	2								1		
WRT-DPRW	MAND.																			
	DES.			1						1										3
Multipurpose	MAND.			3																
	DES.																			3
Normal and Critical Channels	MAND.																			
	DES.									3										
NFS	MAND.			1						1										
	DES.			1			2		1	2								1		

Ranking

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
WATER MODELS CONTINUED								
ISOQUAD	MAND.	9						
	DES.		13	2	1	72	25	
ISOQUAD 2	MAND.	10						
	DES.		16	2	1	72	25	
LEVEL III RECEIVING WATER	MAND.	12						
	DES.		15	2	1	78	21	
LOG PEARSON GAGED STREAMS	MAND.	0						
	DES.		0	2	1	0		
LOG PEARSON REGIONAL ANALYSIS	MAND.	0						
	DES.		0	2	1	0		
MAGSUM	MAND.	7						
	DES.		16	2	1	64	29	
MAGNUM 3D	MAND.	9						*
	DES.		16	3	1	102	11	
MIT Transient Water Quality	MAND.	13						
	DES.		18	2	1	88	15	
WRT-DPRW	MAND.	9						
	DES.		17	2	1	70	26	
Multipurpose	MAND.	7						
	DES.		3	2	1	54	35	
Normal and Critical Channels	MAND.	5						
	DES.		10	2	[illegible]	40	39	
NFS	MAND.	10						
	DES.		13	2	1	76	21	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

		LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS										RANKING						
MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3MW/DNC	WSMC/SEM	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	OSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
RECEIV II	MAND.	3	1				1		1		1					2			1					1	1											12						
	DES	3	1				2				1	2				2			1			2		1	2								1				18	3	1	126	6	*
[illegible]DEQUL-EPAK	MAND.	3					1		3							2																				9						
	DES.	1					1	2	1			2				2			1					1											2		13	2	1	62	31	
AISAM	MAND.	3									2					2			2					1	1											11						
	DES.	3					1					3				1			1			2		1	2								1				15	2	1	74	24	
RWQM	MAND.	3														3			1					1	1											9						
	DES.	3					2				1	3				1			1			3		1	2								1		1		19	2	1	74	24	
Saturated/Unsaturated Flow 3D	MAND.	3					1		3							3																				10						
	DES.	3					2	3				3				2			1						1										3		18	2	1	76	22	
Saturated/Unsaturated Transport 3D	MAND.	3					1		3							3																				10						
	DES.	3					2	3				3				2																			3		16	2	1	72	25	
SEDMNT	MAND								3																											3						
	DES.	3																																			3	2	1	18	46	
SEM	MAND.	3									2					3			2					1	1											12						
	DES.	3					1					3				1			1			3		1	2								1		1		17	3	2	246	1	*
SESOIL	MAND.	3							3							3																				9						
	DES.	2					2	3				3				2																			3		15	3	1	99	12	
Simultaneous Transport Thru Multilayer Soil	MAND.	3							2							2																				7						
	DES.	2					1	3				2				1			1					1											2		13	2	1	54	35	
SWSIM	MAND	3	1								1					2			1					1	1											10						
	DES.	3	1				1				1	3				1			1			2		1	3								1				18	3	1	114	8	*
SSM	MAND.	3									2	3							2					1	1											12						
	DES.	3					1					1							1			3		1	1								1				12	3	2	216	4	*

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
Open Channel Runoff	MAND.		2						3							
	DES.	3					3				2	2				2
Prickett Longquist	MAND.	3								3						1
	DES.	1					1	3				3				2
PLUME	MAND.	3														2
	DES.	3					2				2	3				1
PIREFLO	MAND.	3								3						2
	DES.	[illegible]					1	3				3				1
QUAL II	MAND.	3									1					2
	DES	3					1					3				1
STORM	MAND.	2	1				1	1			1					2
	DES.	3	1				2				1	2				2
Storm Hydrograph	MAND		1					3								
	DES	2					3				2					2
STROH	MAND.		1					3								1
	DES.	1	1				1				3					1
Stream TB	MAND.	3	1								2					3
	DES.	3	1				1					3				1
WAS	MAND.		2					2								
	DES.	2					2				2	1				2
WATEQ2	MAND.	3							3							2
	DES.	1					1	3				3				2
WATSPEC2	MAND.	3	1								2					2
	DES.	3	1				2					3				1

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-ER	MMCI	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ SWW/DNC	WSMC/SEM
Open Channel Runoff	MAND.																			
	DES.									3										
Prickett Longquist	MAND.																			
	DES.																			3
PLUME	MAND.			2					1											
	DES.			1			3		2								2			
PIREFLO	MAND.																			
	DES.			1						1										3
QUAL II	MAND.			2				1	1											1
	DES			1			3		1	1							1			
STORM	MAND.			1					1	1										
	DES.			1		2			1	2							1			
Storm Hydrograph	MAND																			
	DES									3										
STROH	MAND.																			
	DES.									3										
Stream TB	MAND.			2					1	1										
	DES.			1		2			1	2							1			
WAS	MAND.									1										
	DES.									2										
WATEQ2	MAND.																			
	DES.									1									3	
WATSPEC2	MAND.			2						1										
	DES.			1		2				2							1			

MODELS	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
Open Channel Runoff		15	2	1	50	16	
Prickett Longquist		13	3	[illegible]	41	19	
PLUME		11	2	[illegible]	[illegible]	[illegible]	
PIREFLO		15	3	1	[illegible]	[illegible]	
QUAL II	8	14	3	1	90	14	*
STORM	11	18	1	1	40	40	
Storm Hydrograph	4	12	2	1	[illegible]	[illegible]	
STROH	5	10	2	1	[illegible]	[illegible]	
Stream TB	13	16	2	1	94	17	
WAS	5	11	3	2	63	30	
WATEQ2	8	14	2	1	[illegible]	12	
WATSPEC2	11	16	3	1	[illegible]	[illegible]	

TABLE B-2. AIR FORCE GROUP MODELNG NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS										RANKING						
		HQ AFLSC/RDV	HQ AFESC/DEV	HQ AFLSC/RD	HQ AFLSC/ACD	HQ AFESC/WL	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DLV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DLV	WRIGHT-PAT. AFB/DEE	AFRCE-CR	AFRCE-LR	MMOI	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 5WW/DNC	WSMC/SEM	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
SWAN	MAND.	3									1					2			1					1												8						
	DES.	3					2					2				2			1			2		1	1								1		1		16	2	1	64	29	
SWMM	MAND.	2	1				1		2		1					2			1						1											11						
	DES.	3	1				2				1	2				2			1			2		1	2								1				13	3	1	120	7	*
T3FEMA	MAND.	3					1		3							2																				9						
	DES.	2					1	3				3				3			1						1										3		17	2	1	[illegible]	26	
THERMAL PLUME	MAND.	3									1					2			2					1	1											11						
	DES.	3					3					2				1			1			3		1	2								2				18	2	1	90	20	
THYSYSy	MAND.		2						3							1																				6			2			*
	DES.	2	1				2				3	1				2									3												14	2		104	10	
Time-Dependent Hydo-Dynamic	MAND.	3	.				1		1	1						2			1																	10						
	DES.	3	1				2					2				1			1						1								1				15	2	1	70	29	
Time-Dependent 3D Transport	MAND.	3	1				1				2					2			1					1												11						
	DES.	3	1				2					2				2			1			2		1	1								1				16	2	1	76	22	
TR20	MAND.																																			0						
	DES.																																				0	3	1	0	-	
TTM	MAND	3									3					3			3					1												13						*
	DES.	3					3					3							3			3		2	3								2				22	2	1	96	13	
USDAHL-74	MAND.		2						3																1											9						
	DES.	3					2				2					2									3												22	3	1	72	25	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
AHTM	MAND.	2	1				1		2		1					1
	DES.	3	1				2				1	2				2
ACAM	MAND.	3	1								1					2
	DES.	3	1				2					2				1
WQRRS	MAND.		1				1		3							
	DES.	2	2				1		3		2					
WSP2	MAND.		2					3								1
	DES.	2	1				2				3	1				1
AIR MODELS																
Adobe Equation	MAND.	3				3	3	3	3							3
	DES.	3					3	3				3				
Aerial Spray	MAND.	3				3	3	3	3							3
	DES.	3					3	3				3				
AIRTEST	MAND.															
	DES.															
APRAC1a	MAND.	3				3	3	3	2							3
	DES.	2	1				3	3	2	1		3				2
APRAC2	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	1	1		3				2

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DLEV	HQ SD/WE	HQ SWM/DNC	WSMC/SEM
AHTM	MAND.			1						[illegible]										
	DES.			1			2		1	2								1		
ACAM	MAND.			2						1										
	DES.			1			2			1								1		
WQRRS	MAND.														1					
	DES.									3					1					
WSP2	MAND.																			
	DES.									3										
AIR MODELS																				
Adobe Equation	MAND.													3						
	DES.			3																3
Aerial Spray	MAND.									3				3						
	DES.			3																3
AIRTEST	MAND.																			
	DES.																			
APRAC1a	MAND.			2					1	1				3				1		
	DES.			1			3		2	[illegible]								2		1
APRAC2	MAND.			1						[illegible]				3				1		
	DES.			1			3		2	1								1		3

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
AHTM	MAND.	10						
	DES.		28	3	1	114	8	*
ACAM	MAND.	10						
	DES.		15	3	2	105	9	*
WQRRS	MAND.	6						
	DES.		14	3	1	84	17	
WSP2	MAND.	6						
	DES.		13	2	1	53	36	
AIR MODELS								
Adobe Equation	MAND.	21						
	DES.		18	3	2	360	3	*
Aerial Spray	MAND.	24						
	DES.		18	2	2	264	5	*
AIRTEST	MAND.			2	1			
	DES.							
APRAC1a	MAND.	24						
	DES.		23	3	[illegible]	231	[illegible]	*
APRAC2	MAND.	23						
	DES.		28	2	1	148	22	*

TABLE B-2. AIR FORCE GROUP MODELING NEEDS REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS										RANKING						
		HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
A/AP	MAND.	3				3	3	3	3							2			1					1	1				3				1			24						
	DES.	2	1				3	3	2	1		2				2			1			3		2	2								2		3		30	2	1	136	18	*
AVCDM	MAND.	3				3	3	3	3							3			2					1	1				1							21						
	DES.	3	2				3	3		1		2				1						3		1	2								1		3		22	3	2	384	2	*
BLP	MAND.	3				3	3	3	3							3								1					3				1			23						
	DES.	3	1				3	3		1		3										2		2	2								2		3		25	2	1	142	24	*
CDM	MAND.	3				3	3	3	2							2			1					1	1				2				1			22						
	DES.	2	1				3	3	2	1		3				2			1			3		2	2								2		3		30	2	1	148	22	*
CDMQC	MAND.	3				3	3	2	3							2			1					1	1				3				1			22						
	DES.	2	1				3	3	1	1		3				2			1			3		2	1								2		3		28	3	1	216	12	*
CRSTER	MAND.	3				3	3	2	3							2			1					1	2				2				1			22						
	DES.	2	1				3	3	2	1		3				2			1			3		2	1								2		3		29	3	1	[illegible]	11	*
CRSTER2	MAND.	3				3	3	2	2							2			1					1	1				2				1			21						
	DES.	2	2				3	3	2	1		3				1			1			2		2	2								2		3		29	2	1	142	24	*
AQAM	MAND.	3				3	3	3	3							3			1					1	1				3				1			24						
	DES.	2	1				3	3	1	1		3				1			1			3		1	1								2		3		26	3	1	222	10	*
ACDM	MAND.	3				3	3	3	3							3								1	1				3							23						
	DES.	2	1				3	3				3							3			2		2	1								2		3		23	2	1	138	26	*
ATDL	MAND.	3				3	3	2	3							2			1					1	1				2				1			22						
	DES.	2	1				3	3	1	1	3					1			1			3		[illegible]	[illegible]								2		3		27	[illegible]	1	213	13	*
ATM	MAND.	3				3	3	2	3							2			1					1	1				2				1			22						
	DES.	2	1				3	3	1	1		3				1			1			3		1	1								2		3		26	2	1	142	25	*

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELLING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
HIWAY	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
HIWAY2	MAND.	3				3	3	2	2							2
	DES.	2	1				3	3	2	1		3				2
TSC	MAND.	3				3	3	3	3							3
	DES.	3	1				3	3		1		3				
LIRAQ	MAND.	3				3	3	2	2							2
	DES.	2	1				2	3	1	1		3				1
LPACSM	MAND.	3				2	3	2	3							3
	DES.	2	1				3	3	2	1		3				1
MOD-IWAY	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
Modified Cramer Gaussian	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	1			3				1
Mountain Iron	MAND.	3				3	3	2	3							2
	DES.	2	1				3	3	1	1		3				1
MPTER	MAND.	3				3	3	2	2							2
	DES.	2	2				3	3	2	1		3				2
Ocean Breeze Dry Gulch	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	1	1		3				1
OZIPP	MAND.	3				2	3	2	2							2
	DES.	2	1				2	3	1	1		3				2

MODELS	AIR FORCE GROUPS WITH MODELLING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DELV	HQ SD/WE	HQ SWW/DNC	WSMC/SEM
HIWAY	MAND.			2										3				1		
	DES.			1			3		2	1								2		3
HIWAY2	MAND.			1					1	2				2				1		
	DES.			1			3		2	1								2		3
TSC	MAND.								1	1				3				1		
	DES.			3			2		2	2								2		3
LIRAQ	MAND.			1					1	2				2				1		
	DES.			1			2		1	2								2		3
LPACSM	MAND.			2					1	1				3				1		
	DES.			1			3		1	1								2		3
MOD-IWAY	MAND.			1						2				3				1		
	DES.			1			3		2	1								1		3
Modified Cramer Gaussian	MAND.			1						1				2				1		
	DES.						3		1	1								1		3
Mountain Iron	MAND.			1					1	1				2				1		
	DES.			1			3		1	2								2		3
MPTER	MAND.								1	2				2				1		
	DES.			1			3		2	1								2		3
Ocean Breeze Dry Gulch	MAND.			1					1	1				2				1		
	DES.			1			3		1	2								2		3
OZIPP	MAND.			1					1	1				2				1		
	DES.			1			2		1	2								2		3

MODELS	AIR FORCE GROUPS WITH MODELLING NEEDS	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
HIWAY	MAND.	23						
	DES.		29	3	1	225	9	*
HIWAY2	MAND.	21						
	DES.		29	3	1	213	13	*
TSC	MAND.	24						
	DES.		28	3	1	228	8	*
LIRAQ	MAND.	22						
	DES.		25	2	1	138	26	*
LPACSM	MAND.	24						
	DES.		25	2	1	146	23	*
MOD-IWAY	MAND.	23						
	DES.		28	2	1	148	22	*
Modified Cramer Gaussian	MAND.	21						
	DES.		23	3	1	195	16	*
Mountain Iron	MAND.	22						
	DES.		27	2	2	284	4	*
MPTER	MAND.	22						
	DES.		29	3	1	219	11	*
Ocean Breeze Dry Gulch	MAND.	22						
	DES.		27	2	2	284	[illegible]	*
OZIPP	MAND.	20						
	DES.		26	3	1	198	15	*

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

		LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS										RANKING						
MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEV	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEL	AFRCE-CR	AFRCE-ER	MMOF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ SMW/DNC	WSMC/SEM	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
P232 P236 Plume Rise	MAND.	3				3	3	3	2	1						2			1					1	1				3				1			24						
	DES.	2	1				3	3	3	1		3				2			1			3		1	1								2		3		29	3	2	462	1	*
PAL	MAND.	3				3	3	3	2							2			1					1	1				3				1			23						
	DES.	2	1				3	3	2	1		3				2			1			3		2	2								2		3		30	[illegible]	1	152	20	*
PBM	MAND.	3				3	3	3	3							2			1					1	1				3				1			24						
	DES.	2	2				2	3	1	1		3				1			1			3		2	2								2		3		28	2	1	152	20	*
Penalty	MAND.																																									
	DES.																																					2	1			
PLUVUE	MAND.					3	3	3	2							2			1					1	1				2				1			22						
	DES.	2	1				2	3	1	1		2				1			1			3		1	1								2		3		24	2	1	136	27	*
SIGMET	MAND.	3				3	3	2	2							2			1					1	1				2				1			21						
	DES.	2	1				3	3	1	1		3				2			1			3		1	1								1		3		26	2	1	136	27	*
SLAB	MAND.	3				3	3	2	3							2			1						2				2							21						
	DES.	2	1				3	3	1			3				2			1			3		1	2								2		3		27	2	1	138	26	*
TCM 2	MAND.	3				3	3	2	3							3			1					1	1				2				1			23						
	DES.	2	1				3	3	1	1		3				1			1			3		1	2								2		3		27	2	1	146	23	*
TCM 8	MAND.	3				3	3	3	2							2			1					1	1				3				1			23						
	DES.	2	1				3	3	2	1		3				2			1			3		2	2								2		3		30	2	1	152	20	*
TRAJ	MAND.	3				3	3	2	2							2			1					1	2				2				1			22						
	DES.	2	2				3	3	1	1		2				1			1			3		1	1								2		3		26	3	1	210	14	*
EXPOSURE MODELS											NOT IN AIR FORCE						NEED SURVEY																									
AIRDOS EPA	MAND.	3				3	3	2	2					1					1										2													
	DES.	2	2				3	3	1	1		2		2					1			3		2											3	17	25	2	1	113	3	*
EDMS	MAND.	3							[illegible]		2					3			1	2				1																		
	DES.	3					2				1	3	1			1			2	1		2		1											1	12	17	3		123	2	*

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
PTDIS	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
PTMTP	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
PTMAX	MAND.	3				3	3	3	2							2
	DES.															
PTPLU	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
RAM	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
PCOM	MAND.	3				3	3	3	3							3
	DES.	2	2				3	3	2	1		3				1
REED	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
REGMOD	MAND.	3				3	3	3	2							2
	DES.	2	2				2	3	1	1		3				1
ROLLBACK	MAND.	3				3	3	2	3							2
	DES.	2	1				3	3		1		2				1
PPM II	MAND.	3				3	3	3	2							2
	DES.	2	2				3	3	2	1		3				1
SAIASP	MAND.	3				3	3	2	2							2
	DES.	2	1				2	3	1	1		3				2

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-LR	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM
PTDIS	MAND.			1					1	1				3				1		
	DES.			1			3		2	2								2		3
PTMTP	MAND.			2					1	1				3				1		
	DES.			1			3		2	1								2		3
PTMAX	MAND.			1					1	2				3				1		
	DES.																			
PTPLU	MAND.			1					1	1				3				1		
	DES.			1			3		2	2								2		3
RAM	MAND.			1					1	1				3				1		
	DES.			1			3		2	2								2		3
PCOM	MAND.			2					1	1				3				1		
	DES.			1			3		2	1								2		3
REED	MAND.			1					1	1				3				1		
	DES.			1			3		2	1								2		3
REGMOD	MAND.			1					1	1				3				1		
	DES.			1			3		1	2								2		3
ROLLBACK	MAND.			1					1	1				1						
	DES.						3		1	2								1		3
PPM II	MAND.			2					1	1				2				1		
	DES.			1			3		2	2								2		3
SAIASP	MAND.								1	1				2				1		
	DES.			1			3		1	2								2		3

MODELS	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
PTDIS	23	30	3	1	[illegible]	3	*
PTMTP	24	29	2	1	154	19	*
PTMAX	28	30	2	1	172	19	*
PTPLU	23	30	3	2	228	8	*
RAM	[illegible]	30	3	1	228	8	*
PCOM	26	29	3	1	243	6	*
REED	23	29	2	1	150	21	*
REGMOD	23	27	3	1	219	11	*
ROLLBACK	20	23	3	1	189	17	*
PPM II	23	30	2	1	152	[illegible]	*
SAIASP	21	27	2	1	238	25	*

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS					
		HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/ME	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
Turner's Workbook	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				1
VALLEY	MAND.	3				3	3	3	2							2
	DES.	2	1				3	3	2	1		3				2
MULTIMEDIA MODELS																
ALMAS	MAND.	3				2	2	3		1		2				2
	DES.	2	2				2	2		1		1				1
EICS	MAND.															
	DES.															
ENPART	MAND.															
	DES.															
NEELY METHOD	MAND.															
	DES.															
NLEV3	MAND.															
	DES.															
TTM	MAND.	3				3	3	3	2							2
	DES.	2	1				2	2	1	1		2				1
GEOLOGY & SOIL MODELS											NOT IN AIR FORCE					
GSOIL	MAND.															
	DES.															
EARTH	MAND.															
	DES.															

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES									OTHER AIR FORCE GROUPS									
		EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DLV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/ME	HQ 3WW/DNC	WSMC/SEM
Turner's Workbook	MAND.			1					1	1				3				1		
	DES.			1			3		2	2								2		3
VALLEY	MAND.			1					1	1				3				1		
	DES.			1			3		2	2								2		3
MULTIMEDIA MODELS																				
ALMAS	MAND.			1		2			1	1				3				2		
	DES.			1		1	2		1									2		3
EICS	MAND.																			
	DES.																			
ENPART	MAND.																			
	DES.																			
NEELY METHOD	MAND.																			
	DES.																			
NLEV3	MAND.																			
	DES.																			
TTM	MAND.			1					1	1				3				2		
	DES.			1			2		1									1		3
GEOLOGY & SOIL MODELS		NEED SURVEY																		
GSOIL	MAND.																			
	DES.																			
EARTH	MAND.																			
	DES.																			

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	RANKING						
		FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
Turner's Workbook	MAND.	23						
	DES.		29	3	2	225	9	*
VALLEY	MAND.	23						
	DES.		30	2	1	152	20	*
MULTIMEDIA MODELS								
ALMAS	MAND.	25						
	DES.		20	1	1	70		
EICS	MAND.							
	DES.			2	1			
ENPART	MAND.							
	DES.			3	2			
NEELY METHOD	MAND.							
	DES.			1	2			
NLEV3	MAND.							
	DES.			2	2			
TTM	MAND.	24						
	DES.		20	3	1	204		*
GEOLOGY & SOIL MODELS								
GSOIL	MAND.							
	DES.			2	1	[illegible]		
EARTH	MAND.							
	DES.			1	1	0		

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
SANGRE	MAND.															
	DES.															
ELOP2	MAND.															
	DES.															
ELOP3	MAND.															
	DES.															
REPRISE	MAND.								?							
	DES.															
TOXFLO	MAND.		1						3							
	DES.	2	1								2					2
Workplace Noise	MAND.								?							
	DES.															

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEL	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-CR	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRLSS	AD/DLLV	HQ SD/WE	HQ SMW/UNC	WSMC/SEM
SANGRE	MAND.																			
	DES.																			
ELOP2	MAND.																			
	DES.																			
ELOP3	MAND.																			
	DES.																			
REPRISE	MAND.			3																
	DES.																			
TOXFLO	MAND.																			
	DES.				2															
Workplace Noise	MAND.			3																
	DES.																			

MODELS	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	OSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
SANGRE			1	1	0		
ELOP2			1	1	0		
ELOP3			1	1	0		
REPRISE	3		2	1	12	6	
TOXFLO	4	3	2	1	36	4	
Workplace Noise	3		3	1	19	5	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS: HQ AFESC/RDV	HQ AFLSC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HEADQUARTERS MAJOR COMMANDS: HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	AIR FORCE BASES: EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE
Slope Stability Analysis 2	MAND. DES.																								
Slope Stability Analysis 3	MAND. DES.																								
ECOLOGY MODELS											NOT IN AIR FORCE						NEED SURVEY								
Lake Michigan Entrophication	MAND. DES.																								
MS CLEANER	MAND. DES.																								
SSEG	MAND. DES.																								
Vegetation Communities on a Gradient	MAND. DES.																								
GENERAL SOCIOECONOMIC MODELS											NOT IN AIR FORCE						NEED SURVEY								
CELSS	MAND. DES.																								
EIFS	MAND. DES.																								
PTM	MAND. DES.																								

MODELS	OTHER AIR FORCE GROUPS: AFRCE-CR	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM	RANKING: FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
Slope Stability Analysis 2													1	1	0		
Slope Stability Analysis 3													1	1	0		
ECOLOGY MODELS																	
Lake Michigan Entrophication													2	1	0		
MS CLEANER													2	1	0		
SSEG													2	1	0		
Vegetation Communities on a Gradient													2	1	0		
GENERAL SOCIOECONOMIC MODELS																	
CELSS													2	1	0		
EIFS													1	1	0		
PTM													1	1	0		

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS										RANKING						
		HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	AFRCE-CK	AFRCE-ER	MMGF	TRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ SWW/DNC	WSMC/SEM	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	GSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
GLOBAL 79	MAND.																		3																							
	DES.								?																											3		2	1	12	6	
HEP	MAND.	3				3	3	2	2				1			2			1					1	1				2				1									
	DES.	2	1				2	3	1	1		3	2			2			1			3		1	2								2		3	22	29	2	1	146	1	*
MANTELAN	MAND.								?										3																							
	DES.																																			3		2	1	12	6	
MATH MODEL FAST SCREEN	MAND.								?										3																							
	DES.																																			3		2	2	12	6	
MAXDOSE	MAND.								?										3																							
	DES.																																			3		2	1	12	6	
MULTIBOG	MAND.								?										3																							
	DES.																																			3		1	1	12	6	
ONE HIT MG	MAND.								?										3																							
	DES.																																			3		1	1	12	6	
RADRISK	MAND.								?										3																							
	DES.																																			3		2	1	12	6	
RANK TIME	MAND.								?										3																							
	DES.																																			3		2	1	12	[illegible]	

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS					
		HQ AFESC/RDV	HQ AFESC/DEV	HQ AFESC/RD	HQ AFESC/ACD	HQ AFESC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES
NOISE MODELS																
Acoustic Impact Prediction	MAND.		3													3
	DES.						3	3			3				1	
CSM	MAND.		3													
	DES.						3	3				3			1	
Michigan Highway	MAND.		3													3
	DES.						3	3				3				
NOISEMAP	MAND.		3												3	3
	DES.						3	3				2				
RDM	MAND.															
	DES.															
Strategy Model	MAND.															
	DES.															
Workplace Noise	MAND.															
	DES.															
WASTE DISPOSAL MODELS											NOT IN AIR FORCE					

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	AIR FORCE BASES									OTHER AIR FORCE GROUPS									
		LOLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEE	AFRCE-CR	AFRCE-ER	MMGI	IRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM
NOISE MODELS																				
Acoustic Impact Prediction	MAND.									2										
	DES.								2						2					3
CSM	MAND.									3										
	DES.								2	1					2			2		3
Michigan Highway	MAND.									1										
	DES.								1						1			1		3
NOISEMAP	MAND.									1										
	DES.						3		3	3					3			2		3
RDM	MAND.																			
	DES.																			
Strategy Model	MAND.																			
	DES.																			
Workplace Noise	MAND.																			
	DES.																			
WASTE DISPOSAL MODELS		NEED SURVEY																		

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	RANKING						
		FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	USC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
NOISE MODELS								
Acoustic Impact Prediction	MAND.	8						
	DES.		17	2	2	132		
CSM	MAND.	9						
	DES.		20	2	1	76		
Michigan Highway	MAND.	7						
	DES.		15	2	1	58		
NOISEMAP	MAND.	10						
	DES.		26	2	1	92		
RDM	MAND.							
	DES.			2	1	0		
Strategy Model	MAND.							
	DES.			2	1	0		
Workplace Noise	MAND.							
	DES.			2	1	0		
WASTE DISPOSAL MODELS								

TABLE B-2. AIR FORCE GROUP MODELING NEED REFERENCED TO MODEL CAPABILITIES (CONTINUED).

MODELS	AIR FORCE GROUPS WITH MODELING NEEDS	LABORATORIES AND SPECIAL CENTERS									HEADQUARTERS MAJOR COMMANDS						AIR FORCE BASES									OTHER AIR FORCE GROUPS										RANKING						
		HQ AFLSC/RDV	HQ AFLSC/DEV	HQ AFLSC/RD	HQ AFLSC/ACD	HQ AFLSC/WE	USAF ETAC	HQ AWS	USAF OEHL	AFGL	HQ ATC	HQ SAC	HQ MAC	HQ AFSC	HQ AFLC	HQ AFRES	EGLIN AFB/SGP	KELLY AFB/DEP	RANDOLPH AFB/SGP	RANDOLPH AFB/DEV	SCOTT AFB/SGP	SCOTT AFB/DEV	TYNDALL AFB/SGP	TYNDALL AFB/DEV	WRIGHT-PAT. AFB/DEL	AFRCE-CR	AFRCE-ER	MMGF	IRW/DSSG	DCS/CIVIL	AD/KRESS	AD/DEEV	HQ SD/WE	HQ 3WW/DNC	WSMC/SEM	FIT WITH MAND. REQS.	FIT WITH DES'D. REQS.	OSC TECH. RANK	MICRO POTENTIAL	COMPOSITE RANK	RANK ORDER	MOST PREFERRED
HACS	MAND.	3						1	3							3			3																	13						
	DES.	2					2	3			3					1						3		3	3								2		3		25	3	2	306		
SAM	MAND.	3						2	3							3			3																	14						
	DES.	3					3	3			3					1						3		3	3								3		3		28	2	2	224		
ADTRES	MAND.																																									
	DES.																																					2	1	[illegible]		
IRS	MAND.																																									
	DES.																																					2	1	3		
WRAP	MAND.																																									
	DES.																																					2	1	[illegible]		
CHEMICAL SPILL MODELS																																										
CHRIS	MAND.	3						1	3							3			3																	13						
	DES.	2					2	3			3					1						3		3	3								2		3		25	3	2	306		

1 = < 33%   2 = 33 - 66%   3 = > 66%

FIT WITH MANDATORY REQUIREMENTS (m)

Numbers in this column are the sum of the mandatory requirement fit numbers on the model line.

FIT WITH DESIRED REQUIREMENTS (a)

Numbers in this column are the sum of the desired requirement fit numbers on the model line.

TECH RANK (t)

Numbers in this column are General Software Corporation's technical assessment of the model in the context of Air Force need.

3 = Outstanding   2 = Highly Recommended   1 = Recommended

(Models not recommended were excluded from this analysis.)

MICRO POTENTIAL (p)

Numbers in this column indicate that the model is practical to operate on a microcomputer.

2 = Micro Potential   1 = No Micro Potential

COMPOSITE NUMBER (C)

Numbers in this column are a composite number formed from the sum of the number of groups with mandatory needs (m) and desired needs (d) satisfied by the model, the technical quality of the model (t) and its potential to run on microcomputers (p) by the following formula $C = (2m + d)\ tp$ (unless both m and d are 0 then $C = 0$).

RANK ORDER

Numbers in this column are the order of magnitude of composite ranks. Equal scores rank alphabetically.

MOST PREFERRED

Marks in this column indicate models GSC selected as most preferred for Air Force needs.

SECTION IV

CLUSTER ANALYSIS FOR MODEL SELECTION

The final analysis to select most preferred models for Air Force use was a cluster of the composite numbers. This analysis scanned the composite numbers of all the models to see if they were occurring in clustered groups or distributed across the scale.

The larger model groups were plotted as histograms to aid the process. These are shown in Figure 1 for water models, Figure 2 for air models, and Figure 3 for exposure models. Two clusters of air models (composite numbers 130-150 and 180-230) and one cluster of water models (60-80) stand out clearly on these histograms. The smaller model groups were scanned directly from Table B-2.

The purposes of this cluster analysis were: 1) to select a cutoff in the composite numbers which fell between clusters and above which there were about 100 model and 2) to identify outliers of the high end and list these as models outstandingly appropriate for Air FOrce needs. Nine models appeared from this analysis: Surface Water Models, SEM; Ground Water Models, Cleary Ground Water Flow, Cleary Ground Water Transport; Air Models, Adobe, AVGTIME and p23 (calculator models); Exposure models, AIR DOS EPA, EXAMS, HEP.

The cutoff selected was composite number 90. All models above this were included in the most preferred model column listed in Table 5 of the main report. All the air models are included, since air models are most needed. Only outstanding water models (a lesser Air Force need) are included.

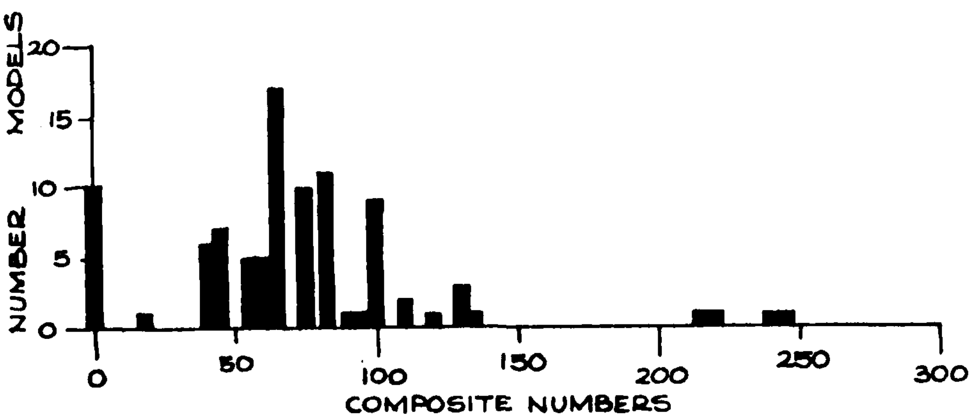

Figure B-1. Histogram of Water Model Composite Numbers.

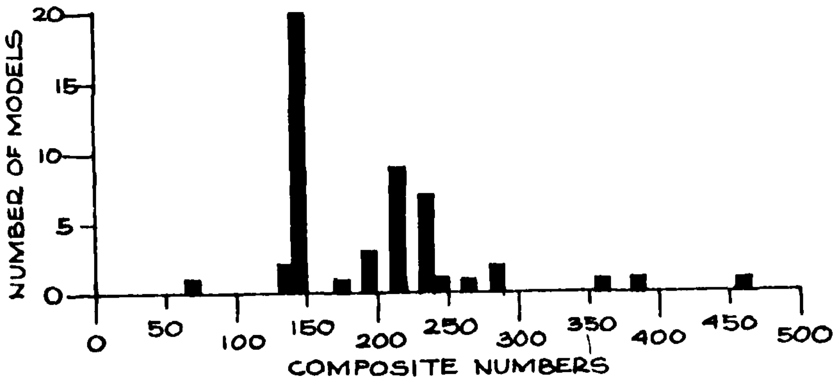

Figure B-2. Histogram of Air Model Composite Numbers

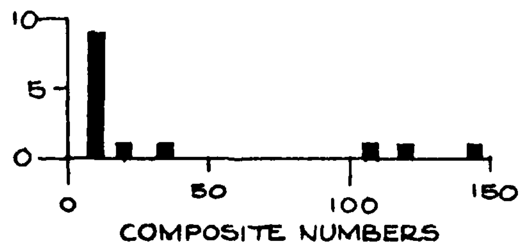

Figure B-3. Histogram of Exposure Model Composite Numbers.

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APPENDIX C

NEEDS AND CAPABILITIES SURVEY

SECTION I

INTRODUCTION

The United States Air Force has used environmental information since it first appeared in 1907 as the Aeronautical Division of the U.S. Signal Corps with a staff of three. Environmental facts and figures, and techniques for handling them have been essential, both for the primary combat mission of the service and for the planning, construction, and operation of combat support facilities.

Air Force needs for environmental information increased sharply with the passage of the National Environmental Policy Act (NEPA) in 1969 and other federal environmental acts in the following years, such as the Coastal Zone Management Act (CZMA) in 1972, the Toxic Substances Control Act (TSCA) and the Resource Conservation and Recovery Act (RCRA) in 1976, the Clean Air Act (CAA) (as amended), the Federal Water Pollution Control Act (FWPA) (as amended), and the Safe Drinking Water Act (SDWA) (as amended) in 1977. States, counties, and municipalities also increased the extent and complexity of their environmental regulations in the 1960s and 1970s. Today the list of environmental laws, rules, and regulations is so large and changes so rapidly that an information system is needed just to know what compliance is required of the Air Force.

In the early 1970s the Air Force successfully argued that the service should be self-policing in compliance with federal environmental regulations. In January 1974, the following pledge was signed by the Secretary of the Air Force and the Air Force Chief of Staff:

> "UNITED STATES AIR FORCE PLEDGE TO ENVIRONMENTAL PROTECTION
>
> The United States Air Force is dedicated to National Defense. Inherent in this dedication is the commitment to protect our environment, to conserve energy and to preserve our natural resources. To this end, each of us pledges to...
>
> Wholeheartedly support and demonstrate leadership for National Objectives to protect, preserve and enhance the environment.
>
> Evaluate, honestly and conscientiously each proposed Air Force action for environmental consequence as an integral part of the decision process.
>
> Comply fully with the most stringent Federal, State, and Local environmental quality standards.

Actively support and participate in Air Force programs for environmental protection - a goal as fundamental as life itself.

Reverse trends in growing energy use without compromise of readiness, or lessening of our ability to fly or fight.

Encourage cooperation in community efforts to control and abate pollution both on and off our Air Force installations."

This pledge, an acrostic with its first letters spelling "We Care," carries with it the responsibility to obtain the best possible environmental information and impact evaluation techniques, and to use these capabilities to ensure that Air Force actions comply with environmental laws. The Base Bioenvironmental Engineers and Environmental Planners are the front-line staff for the implementation and monitoring of this pledge.

The Air Force Engineering and Services Center (AFESC), at Tyndall Air Force Base (AFB) in Florida, is the lead agency in the Air Force for environmental matters. In 1979,the Safety and Environmental Protection Committee of the Joint Army, Navy, NASA, and Air Force (JANNAF) asked AFESC Environics Division (AFESC/RDV) to participate in preparing a catalog of environmental models. In 1979 and 1980, AFESC/RDV conducted surveys of available air and water quality models and Air Force modeling needs and capabilities. From these studies, a number of major issues became clear: 1) the number of available models was large and growing, 2) the quality of models and relevance to Air Force needs varied greatly and 3) the availability of models to Air Force users was much less than the value of models suggested, and improved access was needed.

Discussion of these issues in AFESC/RDV produced the idea of creating an operational Air Force modeling library consisting of the best, most proven models most needed for Air Force applications and a variety of techniques for providing access to the models by Air Force users. AFESC/RDV staff thought that more information was required to establish Air Force modeling needs and capabilities and to make recommendations for the best way to collect and distribute models and modeling data bases.

AFESC/RDV conducted a preliminary letter survey introducing the idea of the modeling library to all Major Commands, Air Force environmental laboratories and service centers, and selected Air Force bases. This letter survey and telephone discussions with AFESC/RDV staff invited comments on the idea of a modeling application library and sought support for further development of the idea.

The responses to these contacts raised several issues which affected the planning of this feasibility study. Models cannot be considered in isolation. Well-maintained, up-to-date data bases are required as input to models. Associated analytical procedures, such as data base management, statistical analysis, and mapping are highly desirable.

The response to the idea of a library containing only models was limited, partly because few people in the Air Force have direct experience with models or understand their potentials. However, response was considerable to the idea of an environmental information network which included not only models, but also data, other analysis techniques, bibliographic text, and general contact information to aid environmental analysts.

The U.S. Army Construction Engineering Research Laboratory (CERL) supports the Environmental Technical Information System (ETIS) which is similar in concept to the idea of an environmental information network for the Air Force. ETIS is a user-friendly computer system which prompts inexperienced users through an increasing number of environmental information retrievals and analytical techniques (discussed in more detail in Section VI.4). CERL staff have found that widespread use of complicated computer analyses must overcome two barriers, unfamiliarity with computer procedures and unfamiliarity with analysis procedures, especially if these are complicated and not arranged to clearly and simply instruct new users. In both computer and analysis procedures, new users' fear of the unfamiliar may be a greater barrier to overcome than the training.

CERL has overcome these problems by designing ETIS as a very user-friendly system. English language prompts are used throughout, "help" commands provide on-line documentation, and a similar command structure is used to control all the analysis techniques. CERL then employs user familiarity with ETIS to overcome user fear of new analysis procedures. The inclusion of models in more general, user-oriented, environmental information systems has led to widespread use of these techniques in the Army.

These considerations caused a slight refocusing of the feasibility study to promote the idea of an environmental information network which contains analysis techniques and other information in addition to models.

Owing to the timing of the survey, visits to Air Force bases and the division of funding for this study between Fiscal Years 1981 and 1982, this interim report concentrates on Air Force needs and capabilities relating to an environmental modeling applications library and distribution network.

Section III outlines the scope of work for the whole feasibility study. Section IV briefly discusses the design of the questionnaire and the travel to Air Force bases. Section V summarizes the findings of the survey. Section VI discusses both U.S. Air Force environmental needs and the capabilities existing in the Air Force and elsewhere which are, or could be, used to satisfy the needs. Section VII states brief conclusions made from the survey of needs and capabilities. Section VIII outlines steps to be completed in the second half of the study.

SECTION II

OUTLINE OF STUDY

The tasks of the original statement of work were defined more precisely and linked into a flow chart shown in Figure C-1. This was the management plan agreed to by AFESC and CEQ. This report summarizes Tasks 1, 2, and 3. The model survey is included in Phase II of this study.

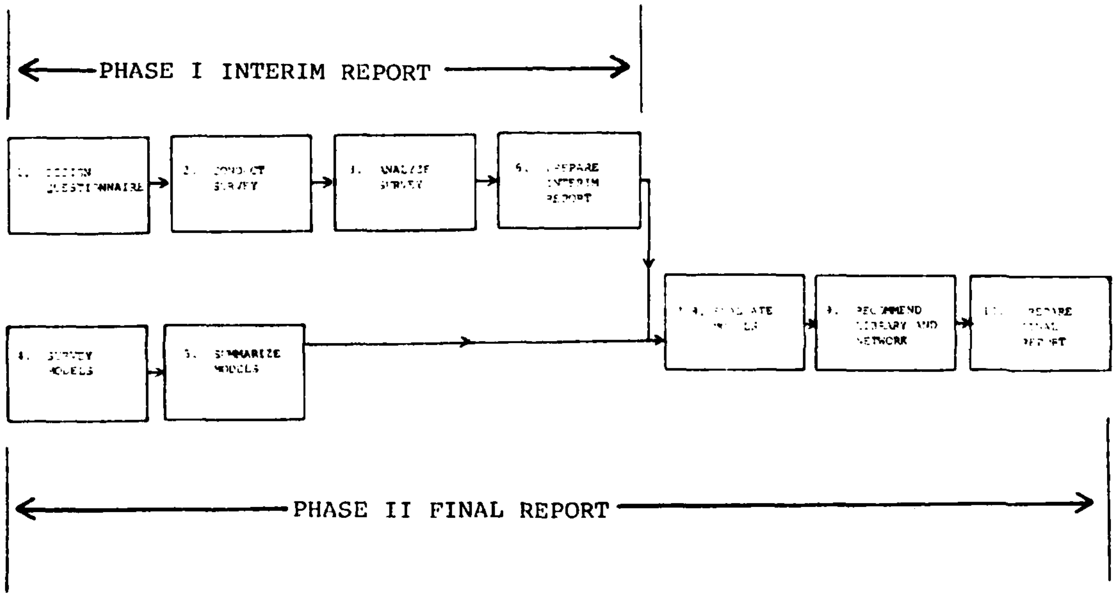

FIGURE C-1. Flow Chart of Tasks

TASK 1 - DESIGN QUESTIONNAIRE AND PRESENTATION

Phase I

This questionnaire design task involved: 1) identifying subjects where answers are needed to establish Air Force needs and capabilities for environmental models and other environmental information and analysis techniques, 2) formulating the questions, 3) coordinating the questionnaire format, 4) preparing for analysis of answers, 5) passing the developing questionnaire drafts through technical reviews by the CEQ and Air Force project officers and contributing subcontractors, 6) laying out the approved questionnaire, and 7) making copies for use in surveys.

The presentation design task involved preparing all text and graphics needed to introduce the idea of an environmental modeling center and information network, illustrating some of the computer systems which could contribute to such a center, and introducing the survey and the questionnaire. An audiovisual presentation, suitable for small or large groups, was prepared and rehearsed.

TASK 2 - PRESENT AND CONDUCT SURVEY

Phase I

This task involved attending meetings at Air Force bases in Florida, Texas, and Illinois, and an Army Research Station, presenting the project and the questionnaire, and conducting person-to-person interviews using the questionnaires with selected Air Force staff to establish current Air Force use of, and needs for, environmental models and other environmental information and analysis techniques.

TASK 3 - ANALYZE SURVEY ANSWERS

Phase I

This task involved collecting and analyzing the answers to the questionnaires. This consisted of counting responses to each answer, converting these to percentages and rankings, identifying and completing interpretive and summary analyses which combine elements of the primary analyses, and writing interpretive text.

TASK 4 - SURVEY SELECTED ENVIRONMENTAL MODELS AND DATA BASES

Phase II

The USAF presently uses a number of automated environmental models. GSC is assembling a library of environmental models for the Environmental Protection Agency. These two sets of models were the first priority for the study in this Air Force project. This task was to assemble available documentation and illustrations of applications and study the functional and system characteristics of the models, emphasizing such features as functional capabilities, skill required to run the models, range of application, portability of software and cost of operation. The principal data bases available to input the models were also surveyed.

In addition, the Coast Guard, several Army agencies and civilian federal agencies presently use environmental models which are available to the Air Force and could further the idea of an environmental information network and modeling library.

TASK 5 - SUMMARIZE SELECTED ENVIRONMENTAL MODELS

Phase II

This task involved summarizing the survey of selected environmental models in a standard format. This format included such functional and system characteristics as purpose, detailed capabilities, applicability, input data requirements, output description, size, software language, hardware operating system, ease and cost of use and software portability. The purpose of these summaries was to provide a standardized reference for comparison with the U.S. Air Force needs established from the analysis of the questionnaires. Standard summaries were completed for all environmental models currently used by the U.S. Air Force, all models now being implemented by General Software Corporation (GSC) for EPA, and other selected models of potential use to the U.S. Air Force.

TASK 6 - PREPARE INTERIM REPORT

Phase I

This task consisted of preparing a letter status report recording the procedures and findings of Tasks 1, 2, and 3. This report discusses the purpose of the study, the design of the questionnaire and reasons for including questions, the U.S. Air Force needs survey process and the analyses of questionnaires. The survey and summary of selected available models (Tasks 4 and 5) are funded in FY 82 and so would be included in the final report. This report is the outcome of Task 6.

TASK 7 - SELECT CRITERIA FOR MODEL EVALUATION

Phase II

This small task involved reaching agreement between the CEQ, the Air Force project officers, and GSC and its subcontractors on the evaluation criteria for environmental models and computer systems and the weight to be given to the criteria.

TASK 8 - EVALUATE ENVIRONMENTAL MODELS

Phase II

This task consisted of evaluating the potential of the environmental models selected in Tasks 4 and 5 to satisfy the needs of the U.S. Air Force determined in Tasks 2 and 3 according to the criteria agreed to in Task 7. Additional sorts through the questionnaire data were made as appropriate. The results are displayed in matrix format and text was prepared summarizing the evaluation of each model.

TASK 9 - RECOMMEND ENVIRONMENTAL MODEL LIBRARY AND INFORMATION NETWORK FOR U.S. AIR FORCE

Phase II

This task consisted of using the analyses of Tasks 3, 5, and 8 and the knowledge and experience of the contractors and project officers to make recommendations for an environmental information network to disseminate access to environmental models, data bases, and other analytical techniques which will be used throughout the Air Force.

In these recommendations emphasis was placed on minimizing the cost and technical difficulty of accessing models and other information and analyses. Reference was made to other projects on modeling and to user-friendly computer analysis systems now being developed.

TASK 10 - PREPARE FINAL REPORT

Phase II

This task consisted of preparing the manuscript for a final report detailing the findings of the study.

SECTION III

OBJECTIVES

General Software Corporation (GSC) included two subcontractors in this study. Production Systems, Inc. (PSI) was commissioned to aid with the design and analysis of a questionnaire to establish both Air Force environmental needs and capabilities and the feasibility of establishing an Air Force environmental modeling library and information network.

The second subcontractor was Arther D. Little, Inc. (ADL), whose staff had experience in toxic chemical data and chemical spill modeling through work on the U.S. Coast Guard Chemical Hazard Response Information System (CHRIS), which includes the Hazard Assessment Computer System (HACS). ADL staff were commissioned, among other tasks, to advise on the questionnaire design, especially in the area of toxic spill modeling. GSC, PSI and ADL proposed the following objectives:

1. To determine the specific tasks undertaken by existing groups involved in environmental activities;

2. To determine the skill and educational levels required to carry out the mission elements for environmental-related activities;

3. To determine the level of computerization by the various groups involved in environmental-related activities;

4. To identify the computer hardware, networking, modes of access and data base activities now used in USAF environmental processing;

5. To determine the present levels of coordination in computer, data base and networking activities for environmental processing;

6. To determine the potential benefits for increased coordination in computer, database and networking activities for environmental processing;

7. To identify and rank the inhibitors to effective information networking for environmental-related activities;

8. To identify those existing AF facilities which could be effectively integrated into an information/data base network for purposes of distributing programs, data, expertise and

hardware capabilities, in order to enhance current environmental activities;

9. To establish current AF use of and need for environmental simulation models;

10. To detail those specific environmental activities now being performed;

11. To determine the current requirements within each activity and how these requirements are being met and could be enhanced.

SECTION IV

SURVEY SUMMARY

Interviews and a questionnaire survey conducted at U.S. Air Force Bases as part of this project have established that there is a clear and urgent need in the U.S. Air Force for better access to environmental information and analytical techniques. In particular, the responsibilities given to Air Force Base Bioenvironmental Engineers and Environmental Planners are quite out of proportion to the information and analysis tools generally available.

The survey reveals many Air Force environmental needs and capabilities which are summarized in this report and detailed in Appendix B. Four areas of need stand out from this survey. The greatest environmental need in the Air Force is improvement of data procedures. Better data collection and distribution, storage, management, quality control, update, formatting, and standardization are almost universal needs.

The most common Air Force environmental application, and the one most deficient in resources, is environmental simulation modeling. Models are used in a wide variety of environmental planning and assessment tasks and in the preparation of environmental impact statements. Air quality modeling is the most needed; but chemical spill modeling, noise modeling, surface and groundwater modeling, and socioeconomic impact modeling are also needed beyond their availability. In particular, improvements in groundwater quality models and simulations of the behavior of heavier-than-air gases are urgently needed.

The deficiencies which prevent improvements in both environmental data and modeling applications are lack of access to computer systems and to information networks. Computer systems include machine-readable data, hardware, and software. Environmental information networks are, above all else, communicating groups of people: well-connected producers and users of resources. The information network should include computer communication, but this is only one medium of connection needed to join people and groups, needs and capabilities.

The Air Force presently has some access to environmental models and related data. The Air Force Engineering and Services Center (AFESC) at Tyndall AFB supports some models on computer facilities at Eglin AFB and is increasing computing facilities for its own use. The Occupational and Environmental Health Laboratory (OEHL) at Brooks AFB has some modeling capability and is planning to acquire more. The Air Weather Service, especially the Environmental Technical Applications Center (ETAC) at Scott AFB, has some specialized air modeling capabilities and large air data bases. Air Force users sometimes use modeling capabilities outside the Air Force, notably the Environmental

Technical Information System (ETIS) supported by the U.S. Army Construction Engineering Research Laboratory (CERL); rocket propulsion models at the NASA George C. Marshall Space Flight Center; and, occasionally, capabilities at the Environmental Protection Agency (EPA). As a general rule these modeling agencies are also the source of environmental data and general information and of other environmental analysis techniques.

Although there are depositories of environmental data, analysis, and modeling techniques available to the Air Force, information about them and means of accessing them are very limited. Potential users who could benefit cannot easily use the existing models. There is, for example, no up-to-date index of where data, analysis techniques, or technical assistance can be found in the Air Force itself, not to mention elsewhere. There are no coordinated user training and support. Base Bioenvironmental Engineers and Environmental Planners have no computer terminals, no ready access to computer facilities, and no time to acquire skills with difficult computer operation procedures. Modeling applications generally are reserved for special projects, the models being specially loaded by expert staff for single runs on centralized facilities. There are no user-oriented capabilities on decentralized facilities, except the Army ETIS system which is limited in its capabilities and sparingly used in the Air Force. Access to information needed in emergencies is also very poor. For example, a month, was needed to find expertise on modeling heavier-than-air-gas dispersion after the Titan II accident.

These problems of limited information and limited access to information are exacerbated further by the high turnover of personnel, especially on the military side. Even when local pools of knowledge accumulate, they rapidly disappear as staff move on to new assignments. It is fair to say that the prime Air Force base-level users of environmental information in their day-to-day tasks have no practical access to the modern data retrieval and analysis tools which are revolutionizing environmental planning and management elsewhere, and saving time, cost, and manpower.

This report surveys Air Force environmental needs and capabilities and details the findings outlined in this summary. Principal Air Force needs for environmental information are identified and compared with already operating environmental capabilities in the Air Force and elsewhere. The effort needed to rectify deficiencies is small compared to potential benefits. Most of the capabilities needed already exist in the Air Force or in available federal agencies, but they have not been connected to the users who most need them. Much of the technology needed for improved connection already exists in the Air Force or will soon be available, and plans are now underway to establish standardized environmental data bases on powerful minicomputers at many Air Force bases. Missing are efficient connections between needs and capabilities; development towards well-

defined and integrated goals; simple, easily learned mechanisms for connecting a diverse community of producers and users; and standardization of data and procedures which would allow easy transfer from place to place.

The skills needed to improve Air Force environmental capabilities are those of coordination and connection. The technical mechanisms of connecting users separate in space, the conceptual problems of transferring data and analysis procedures from producer to user and between users, and the political procedures necessary to ensure cooperation between diverse agencies will all be important.

SECTION V

SUMMARY OF SURVEY FINDINGS

The survey of Air Force personnel to establish environmental needs and capabilities was done in three main ways: first, by collecting answers to a questionnaire either in face-to-face interviews or by letters; second, by collecting information from presentations and tours of Air Force bases; and, third, by collecting and studying documents assembled on the survey tour.

This summary of findings is a condensation of the full analysis of the questionnaire (see Appendix C). Understanding gained from other survey techniques is added where relevant. The order of the summary is the same as that in which the questions were asked.

1. INTERVIEWS

AFESC arranged a schedule to tour Air Force bases, observe facilities, talk informally with Air Force personnel and use the questionnaires for face-to-face interviews. The schedule is shown below.

TABLE C-1. DATA COLLECTION TRIP SCHEDULE

DATE	BASE	ORGANIZATION AND PRINCIPAL CONTACTS
JUNE		
1	Tyndall AFB	Col. Crowley HQ AFESC/RD Col. Duffy HQ AFESC/DEV
2	Eglin AFB	Mr. Dan E. Buffkin Chief, Computer Sciences Division Directorate of Computer Sciences AD/KRC
3	Brooks AFB	Col. William E. Mabson, USAF OEHL/CC Maj. William E. Normington USAF OEHL/ECA Maj. Robert A. Lombard USAF OEHL/ECO
4	Randolph AFB	Lt. Col. Dantzler Capt. Don Bradford HQ ATC/DEV Mr. Tracy Smith Chief, Community Planning, HQ ATC/DEV

TABLE C-1. DATA COLLECTION TRIP SCHEDULE (CONCLUDED)

4	Randolph AFB (continued)	Mr. Bill Myers HQ ATC/DEV Maj. C. Ron Jones HQ ATC/SGPAP
5	Kelly AFB	Lt. Col. Donald D. Higgins USAF Clinic Kelly/SGB
15-16	Scott AFB	Capt. Eugene J. Benuzzi USAF ETAC/DO
17	CERL (U.S. Army)	Dr. Ravinder K. Jain Chief, Environmental Division U.S. Army Corps of Engineers Construction Engineering Research Lab (CERL)

A total of 59 formal questionnaire interviews were conducted. They were distributed as follows:

TABLE C-2. LOCATION OF INTERVIEWS.

Air Force Base	Number of Questionnaire Interviews
Tyndall	22
Eglin	4
Brooks	9
Randolph	8
Kelly	1
Scott	14
Offut	1 (visiting at Scott)
CERL	0 (Army facility, questionnaire did not apply)
Total	59

2. RESPONDENTS TO THE QUESTIONNAIRE

GSC distributed questionnaires on the survey trip and mailed 52 questionnaires to a wide variety of Air Force facilities on a list established by AFESC as having shown interest in modeling and environmental information networking.

Twenty-two questionnaires were returned completed, or with some sections completed from the following locations:

TABLE C-3. LOCATIONS OF MAIL RETURN QUESTIONNAIRES.

Mail Return Source	Number of Mail Questionnaires
Tyndall AFB	5
Scott AFB	2
Randolph AFB	1
Andrews AFB	1
AFRCE	1
Dallas Texas AFRCE	1
Hanscom AFB	1
Hill AFB	1
Los Angeles AFS	1
Offut AFB	2
Ogden Engineering Center	2
Robins AFB	1
Vandenberg AFB	1
Wright Patterson AFB	2
Total	22

Eight of the questionnaires contained little or no information beyond a name and address; a total of 73 was used for the analysis.

All names and group identifiers, addresses, and telephone numbers of questionnaire respondents are listed in Appendix B. Two late arrivals were received from Oklahoma City AFS and the San Antonio Real Property Maintenance Association (SARPMA). The names and addresses and written comments of these two responses are included in this report and Appendix C, but they arrived too late to include the formal replies in the numerical analysis.

3. PRINCIPAL RESPONDING GROUPS

Seventy-three people answered the questionnaire, representing 52 Air Force groups at 15 Air Force bases (AFB), working at major command levels, in laboratories and service centers, and on AFB staff.

Respondents' environmentally related skills included policy-making management and administration, research and development, data base collection and management, software development and maintenance, user support, hardware management, survey and monitoring, chemical analysis, environmental analysis and planning, base management, and emergency response. Rank of the respondents varied from Colonel to

Technical Sergeant, while education levels varied from high school graduates to Ph.Ds.

Responding Air Force locations follow, ordered by the number of groups involved. Specific groups questioned are shown at each location.

PRINCIPAL RESPONDING GROUPS

Location	Principal Groups
Major Response	
Tyndall AFB, Florida	HQ Air Force Engineering and Services Center (HQ AFESC)
	Base Environmental Planning (DEEV) Base Bioenvironmental Engineering (SGPM)
Scott AFB, Illinois	Environmental Technical Applications Center (ETAC)
	Directorate of Computer Sciences, Civil Engineering (DCS/CIVIL)
	MAJCOM Bioenvironmental Engineering HQ Military Airlift Command (HQ MAC/XGPE) Base Environmental Planning (DEEV) Base Bioenvironmental Engineering (SGPE)
Brooks AFB, Texas	Occupational and Environmental Health Laboratory (OEHL)
Eglin AFB, Florida	Armaments Division Computer Systems Branch (AD/KRESS) Armaments Environmental Planning Division (AD/DEEVE) Base Bioenvironmental Engineering (SGPE)
Randolph AFB, Texas	Headquarters Air Training Command Environmental Planning Division (HQ ATC/DEV)
	Base Bioenvironmental Engineering (SGPM)
Minor Response	
Andrews AFB, Maryland	HQ Air Force Systems Command, Energy and Nuclear Effects Division (HQ AFSC/DLWM)

PRINCIPAL RESPONDING GROUPS (CONCLUDED)

Location	Principal Groups
Minor Response (Continued)	
Atlanta, Georgia	Air Force Region Civil Engineer (AFRCE/ER) (in AFESC)
Dallas, Texas	Air Force Region Civil Engineer (AFRCE/CR) (in AFESC)
Hanscom AFB, Massachusetts	Air Force Geophysics Laboratory (AFGL)
Hill AFB, Utah	Directorate of Material Management (MMGF)
Kelly AFB, Texas	Base Environmental Engineer (ABG/DEPD)
Los Angeles, California	Air Force Systems Command (AFSC) HQ Space Systems
Offut AFB, Nebraska	HQ Strategic Air Command (HQ SAC/SGPB) Global Weather Control (DCX) HQ Third Weather Wing (HQ 3WW/DNC)
Ogden Engineering Center, Utah	Titan II (TRW/DSSG)
Robins AFB, Georgia	HQ Air Force Reserves (HQ AFRES/DCS) Environmental Planning Division
Vandenberg AFB, California	Air Force Systems Command (AFSC) Space and Missile Center (WSMC/SEM)
Wright-Patterson AFB, Ohio	HQ Air Force Logistics Command Environmental Planning (HQ AFLC) Base Environmental Planning (ABW/DEEX)

4. USAF ENVIRONMENTAL PERSONNEL

Of the 135 people reported in the survey to be involved with environmental tasks, all graduated from high school; 77 percent have bachelor's degrees; 44 percent have master's degrees, and 10 percent have doctorates. This is well above the average education levels in the general population.

The average annual personnel turnover rate in the past 3 years is 26 percent per year. Turnover rates are much higher on the military than on the civilian side because of the short military tour of duty (3-4 years) and because of the importance of mobility for career advancement.

The high military personnel turnover rates are expected by almost all (85 percent) respondents to continue into the future and were cited by many correspondents as one of the barriers to development of environmental systems since a corporate memory could not develop and successive generations of personnel must learn techniques and procedures.

5. RESOURCES USED FOR ENVIRONMENTAL TASKS

Five different mainframe computers and three different groups of minicomputers were reportedly in use for Air Force environmental applications. Only 34 percent of the sample had access to computers of this size, 29 percent using hardware located outside their own groups. Eighty-three percent of respondents used desk-top units, either stand-alone-microprocessors or programmable calculators. About one-third of respondents found their computer access adequate, one-third, partly adequate, and one-third, inadequate.

Figure C-2 shows the pattern of use of resources used outside the groups surveyed. Most commonly used outside environmental resources are data and personnel from other Air Force locations and federal agencies. The outside environmental facilities considered most successful were the Environmental Sample Analysis Program of the Occupational and Environmental Health Laboratory (OEHL); the Environmental Technical Information System (ETIS) maintained by the U.S. Army Corps of Engineers Construction Engineering Research Laboratory (CERL); and the weather data provided by the Environmental Technical Applications Center (ETAC).

Figure C-3 shows patterns, within the sample, of modes of learning about new developments in environmental information, opinions on the adequacy of computer access, and evaluation of the importance of an information network to promote access to outside resources.

At present the most important means of communication in the Air Force environmental community is informal word of mouth (82 percent), closely followed by technical journals and non-AF sponsored conferences (both 80 percent). Newsletters (40 percent) and seminars (50 percent) within the Air Force assist much less in technology transfer, which suggests one possible area in which coordination could increase productivity.

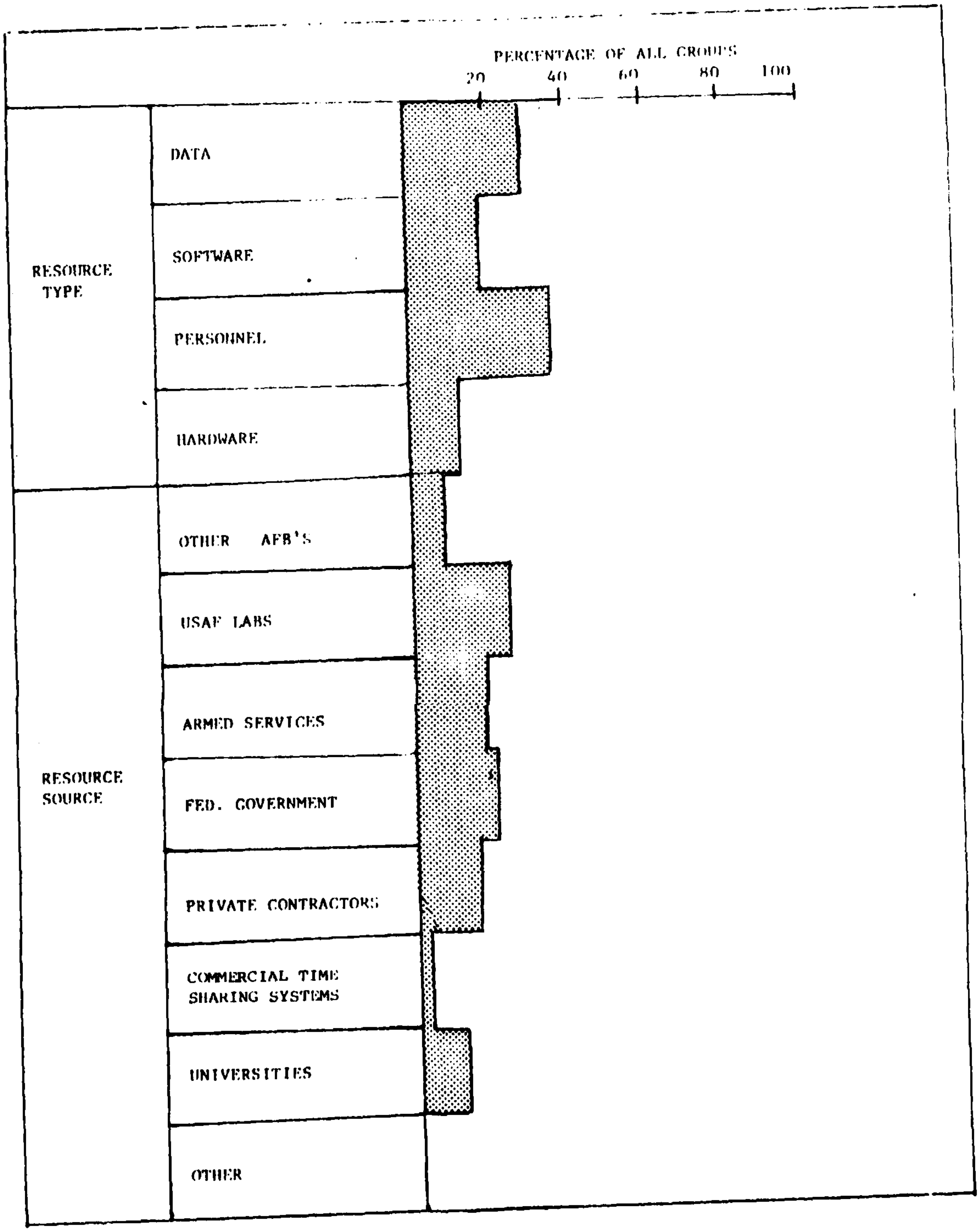

FIGURE C-2. Type and Source of Outside Resources Used

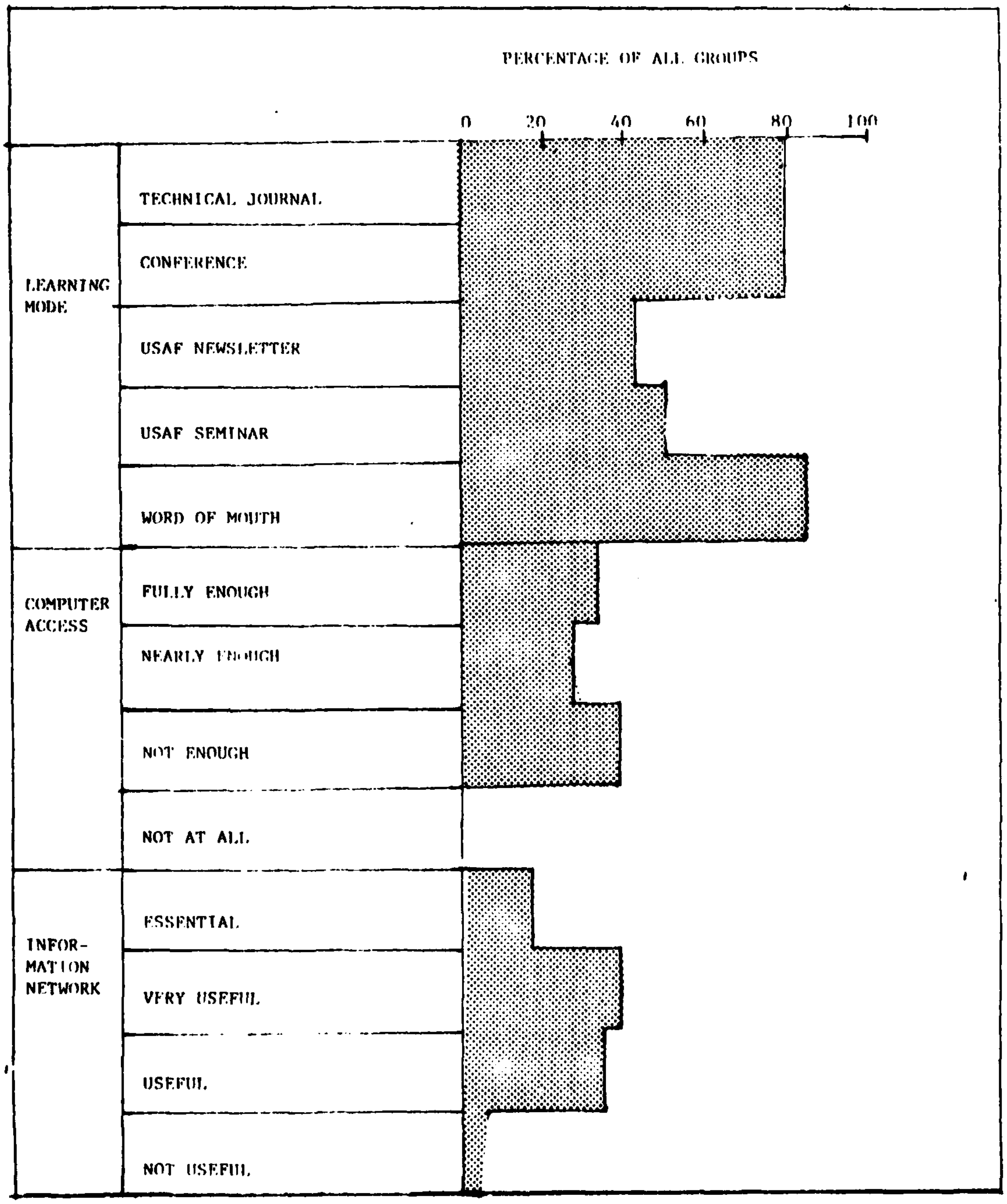

FIGURE C-3. Learning Modes, Computer Access, and Wish to Network

Almost all (96 percent) of the sample thought an environmental information network would be useful, very useful, or essential, 15 percent thought a network essential.

Figure C-4 shows the pattern of elements which inhibit greater use of outside resources. Lack of knowledge, time, and means to discover, learn and implement new techniques are the main obstacles, implying that an environmental network effort must start with simple techniques which are quick to learn and use available resources as much as possible.

A table in the questionnaire asked environmental managers the following set of questions. What must you do? What resources do you have? Are these enough? If not, what more?

The complete answers to these questions, including numbers of people in each group, are included in Appendix E (Table 8) and this analysis table provides a detailed indication of where environmental work is taking place and what resource deficiencies are perceived by the working groups themselves. A summary of the table is included here.

Twenty-seven Air Force groups answered this table representing the environmental work of 240 people. No numbers were counted for the Air Weather Service plans and policy group, because although the respondent was responsible for making policy for 700 staff, worldwide, he indicated that his detailed knowledge of their activities and needs was limited. The Los Angeles Worldway Center numbers were also not counted because no indication was given of the number of staff.

The sample was summarized in three ways: first, to display the degree of Air Force involvement in a variety of environmental activities; second, the degree of deficiency of resources by activity; and, third, the kinds of resources required to overcome deficiencies.

The degree of Air Force involvement by activity was assessed by counting the number of staff in each group involved in each activity, multiplying these numbers by a weighting factor representing the frequency of activity performance (Occasional = 1; Frequent = 2; Major Activity = 3); and then summing the products by activity. These weighings are roughly proportional to the frequency of activity. The frequency ranks, therefore, represent both the number of Air Force personnel involved in a task and the frequency of task involvement. The results of this analysis are shown in Table C-4.

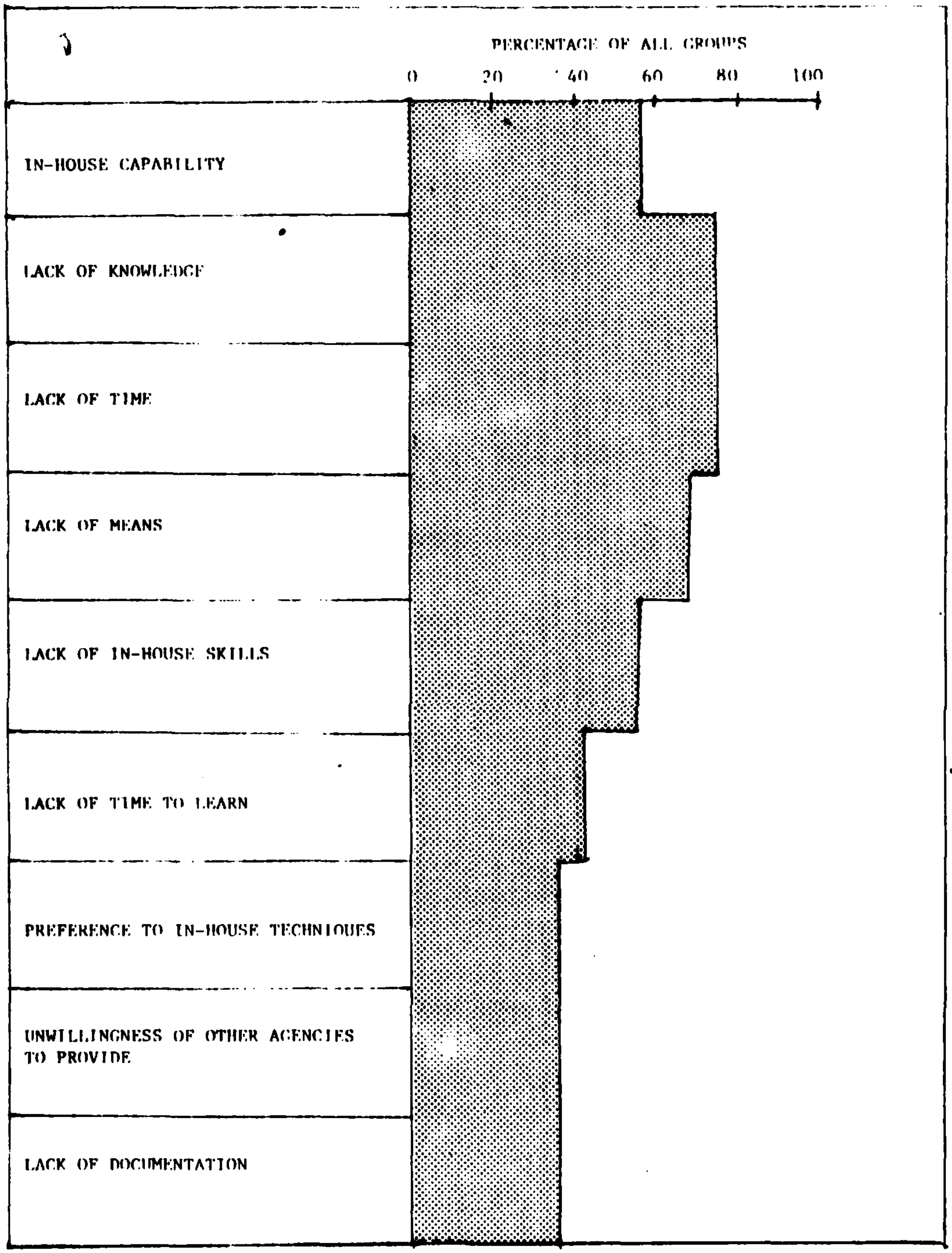

FIGURE C-4. Barriers to Use of Outside Resources

TABLE C-4. FREQUENCY OF USAF ENVIRONMENTAL ACTIVITIES.

Environmental Activity	High Number = Greater Frequency
Data collection from other agencies	398
Data distribution to other agencies	383
Data quality control and verification	279
Data update and maintenance	256
Data reformatting and integration	225
Monitoring	213
Mapping	200
Simulation modeling	197
Impact statement preparation	195
Technical testimony	166
Trend analysis and change detection	163
Software development	146
Hardware selection	122
Software validation	117
Cause and effect analysis	116
Facility location	66
Site planning and design	66
Software maintenance	62
Software documentation	60
Hardware maintenance	48
Photo interpretation	40
Software distribution	39
Software conversion	33
Image analysis	15

A number of issues relevant to this study stand out:

- The overwhelming majority of Air Force environmental work has to do with the collection, verification, storage, formatting, and distribution of data. The least frequent data-related task, mapping, is more frequent than any task involving manipulation or application of the data.

- The most common environmental applications tasks are simulation modeling and preparation of environmental impact statements.

- The activities which would support greater distribution of computer analysis techniques (software maintenance, documentation, conversion and distribution) are among the least frequent activities.

The second summary displays, by activity, the pattern and extent of resource deficiencies. If a group recorded that resources were deficient for a task, the number of people in the group was noted. If

the resources were partly inadequate, this was multiplied by a weighing factor of 1; if the resources were seriously inadequate, this number was multiplied by a weighting factor of 2. These products were then multiplied by weighing factors corresponding to the frequency of the activity within the group (Occasional 1, Frequent 2, Major 3).

The deficiency rankings thus represent the number of people deficient in resources for an activity, the seriousness of the deficiency, and the frequency of the activity. Resources seriously deficient for major activities of large groups are emphasized in this manner.

TABLE C-5. RESOURCE DEFICIENCIES IN USAF ENVIRONMENTAL ACTIVITIES

Environmental Activities Deficient in Resources	Deficiency Rank Higher Number = Greater Deficiency
Data collection for other agencies	333
Mapping	325
Data survey	313
Simulation modeling	301
Preparation of environmental impact Statements	280
Data distribution	250
Data quality control and verification	184
Monitoring	178
Trend analysis and change detection	164
Data reformatting and integration	159
Software documentation	135
Software development	118
Photo interpretation	112
Cause and effect analysis	111
Software validation	94
Software conversion	78
Technical testimony	61
Software maintenance	59
Image analysis	58
Software distribution	56
Hardware selection	48
Facility location	46
Hardware maintenance	45

A number of issues relevant to this study stand out:

- Data deficiencies are the most serious and widespread kind of environmental deficiencies in the Air Force. The availability of data from other agencies, data survey, distribution, quality

control and monitoring all are perceived as being in serious need of improvement.

- Two environmental application activities, simulation modeling and environmental impact statement preparation, are thought to be seriously deficient at present.

- Software documentation appears as the most important software deficiency.

The third summary involved assessing relative amounts of different resources, which the sample indicated would overcome deficiencies. This was done by noting where a group indicated the need for a type of improvement for an activity and recording the number of people in the group. If the resources for the activity were partly deficient, this number was multiplied by a weighting factor 1, if seriously inadequate by 2. These products were then multiplied by weighting factors corresponding to the frequency of the activity (Occasional 1, Frequent 2, Major 3). The numbers for all groups and all activities were then summed by type of resource desired for improvement. The desirability of resources, therefore, reflects need of groups for particular resources in particular activities, the size of groups, the frequency of the activity, and the seriousness of the deficiency.

TABLE C-6. RESOURCE TYPES REQUIRED FOR USAF ENVIRONMENTAL ACTIVITIES.

Type of Resource Required to Overcome Deficiencies	Desirability Rank Higher Number = Greater Desirability
More people	1832
More hardware	1296
More skills	1199
More contact	1170
More data	993

An outstanding need exists for more people; however, if contact were increased and efficient means of transferring data and analysis were established, the need for all other resources would diminish. This is not true of any other type of resource.

6. COMPUTER HARDWARE

The survey indicated there are eight large computers in use for Air Force environmental applications. Five are large mainframes: Cyber 176, Honeywell 6635, CDC 6600, Burroughs B3500, and IBM 4341. One is a close coupling of the large minicomputers, VAX 11/780. Two are smaller minicomputers, seven systems of PDP 11/45 and two of HP.1000. Some of these mainframes and minicomputers are now linked by ARPANET. The diversity of hardware somewhat increases the difficulty of full computer networking by reducing transfer ability of data and software.

Many groups have CRT and hard copy terminals with remote access to computing facilities elsewhere, though there is a noticable lack of terminals at base level. Some groups have microprocessors, plotters, and other graphic input and output capabilities. Use of programmable calculators is widespread.

Currently, an Air Force hardware acquisition procurement is underway, which is of direct relevance to this feasibility study. Bids are being evaluated for an Air Force-wide, base-level installation of large minicompuers to house the Uniform Chart of Accounts for Air Force hospitals. (RFP No. MDA903-81-R-0024). Competitive bids are being evaluated now and a decision may be reached by November, 1982. There are no immediate plans to network these machines, but the project will install powerful, fully compatible minicomputers at many Air Force bases. These machines could be made available for environmental tasks, and enhancements could be added which might be needed for environmental application, such as networking, additional memory, and graphics.

The Occupational and Environmental Health Laboratory (OEHL) presently has proposed to piggyback on these hospital minicomputers with a system called COHP, the Computerized Occupational Health Program. One of the four COHP data bases presently proposed is environmental. This combination of hardware, user support and data could be a very solid base on which to build an environmental modeling library and information network.

7. COMPUTER SOFTWARE

Air Force environmental software is written in the following languages: FORTRAN IV (54%), Basic (18%), various assembler languages (14%), other FORTRAN (3%). COBOL, standard in the Air Force for accounting and administrative applications, is not used at all for Air Force environmental applications since it does not support scientific and geographic programming well.

Air Force software development is taking place in the various environmental subjects within the sample. Most common are programs for air quality analysis or maintenance of air quality data (17%), climate data processing (11%), weather forecasting (11%), water quality data and analysis (11%), chemical noise analysis (5%), hazardous waste analysis (5%), environmental data base management (5%), industrial hygiene (5%), and non-ionizing radiation (5%).

The great majority (69%) of the groups that are developing software are doing so because, to their knowledge, the capabilities which they need are not available elsewhere (this survey shows that some needed capabilities are available); 25% are developing their own software because it is easier and cheaper to do so and 6% because of hardware incompatibility.

The sample shows that 92% of the Air Force groups which develop software (92%) will provide their programs for outside use. All 92% will provide source code, especially to other Air Force groups; 64% will provide software maintenance, debugging and hot line assistance; 50% will provide documentation.

The Directorate of Computer Sciences (DCS) at Eglin AFB currently is converting much software from FORTRAN IV to FORTRAN V. This is lowering accessiblity to some programs because of limited distribution of FORTRAN V compilers. This problem is temporary and could be overcome by including the necessary compilers in the network support computers.

8. COMPUTER SYSTEMS

Figure C-5 shows the pattern of preference for various system characteristics among computer users in the sample. This preference is summarized in Table C-7.

TABLE C-7. PREFERENCE FOR ELEMENTS OF COMPUTER SYSTEMS.

1. Most Important (90% - 100%)
   Availability of interactive terminals
   Database and data manipulation

2. Very Important (70% - 90%)
   Adequate response time
   Adequate operating system
   Adequate memory and disk capacity
   Adequate environmental programs
   Adequate documentation
   Ability to solve large problems
   Graphic applications

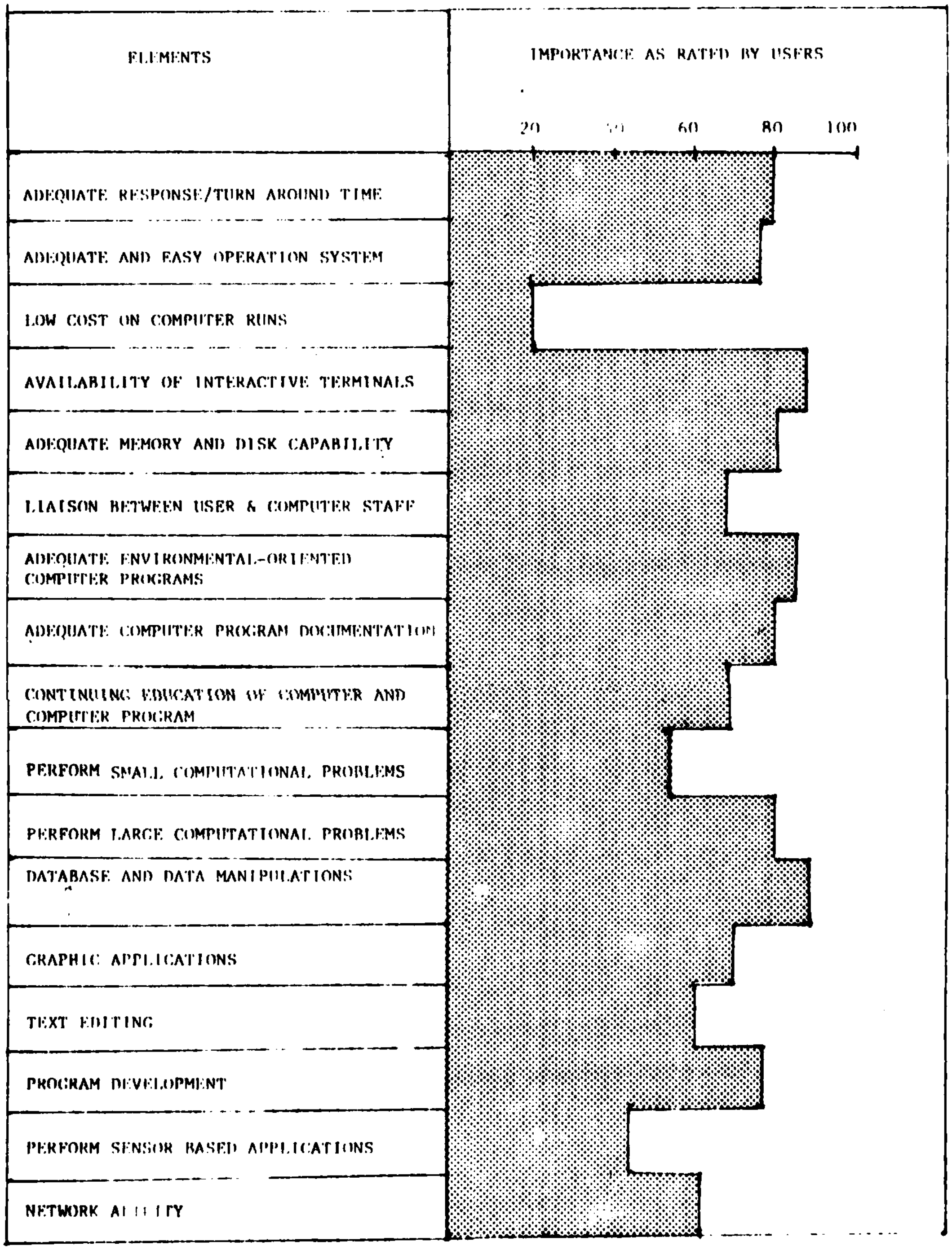

FIGURE C-5. Summary of Preference for Elements of Computer Systems

TABLE C-7. PREFERENCE FOR ELEMENTS OF COMPUTER SYSTEMS (CONCLUDED).

2. (Cont.)
   Program development
   Liasion between users and computer staff

3. Important (50% - 70%)
   Networking
   Perform small computer problems
   Education
   Text editing

4. Relatively Unimportant (>50%)
   Low cost runs
   Sensor based applications

The various groups within the sample were ranked by the extent of their environmental software development and their willingness to distribute their software. The ranks express the potential of each group to provide software support to an Air Force environmental information network. The results were as follows:

Rank 1 Software Groups. Operational software development fully developed; willingness to maintain and share software, and to provide some user support and documentation.

Location	Group
Tyndall AFB	Air Force Engineering and Services Center Aircraft Noise Analysis (AFESC/DEVC)
Scott AFB	Environmental Technical Applications Center Automation Branch (USAF ETAC)
Eglin AFB	Armaments Division Computer Systems Branch (AD/KRESS)

Rank 2 Software Groups. Operations software development significantly developed, willingness to share software, but some elements lacking, such as maintenance or documentation.

Location	Group
Scott AFB	Environmental Technical Applications Center (USAF ETAC/ENB)
	Bioenvironmental Operations
Brooks AFB	Occupational and Environmental Health Laboratory, Health Branch (OEHL/ECO)
Wright-Patterson AFB	Base Environmental Planning Division (2750 ABW/DEEX)

Rank 3 Software Groups. Some elements of software development in place, but not suitable for operational support of outside users.

Location	Group
Tyndall AFB	Air Force Engineering and Services Center Computer Services Branch (AFESC/ACD) Environmental Planning (AFESC/DEV) Environmental Protection and Assessment (AFESC/DEVP)
Scott AFB	Air Weather Service Aerospace Sciences (AWS/DNSP)
Brooks AFB	Occupational and Environmental Health Laboratory Data Automation (OEHL/) Health Branch (OEHL/ECO)

Rank 4 Software Groups. Software development occasionally takes place, but none of the elements necessary for operational distribution are present.

Location	Group
Tyndall AFB	Air Force Engineering and Services Center Natural Resources Division (AFESC/DEVN)
Scott AFB	Air Weather Service Aerospace Physics (HQ AWS/DNXP) Bioenvironmental Engineering (SGPE) Environmental Technical Applications Center Environmental Simulation (USAF ETAC/DNS)
Brooks AFB	Occupational and Environmental Health Laboratory Radiation Services (USAF OEHL/RZN)
Robins AFB	HQ Air Force Reserves Environmental Planning (HQ AFRES/DCS)

There are five main types of environmental computer activities taking place in the Air Force.

(a) Data base Administration - The development and maintenance of machine-readable data bases are taking place mainly at Tyndall AFB, AFESC; Scott AFB, ETAC and Eglin AFB, Armaments Division, Computer Systems Branch AD/KRESS.

(b) Environmental Modeling Software - The development and maintenance of environmental simulation models are taking place mainly at Tyndall AFB, AFESC; Scott AFB, ETAC; Eglin AFB, AD/KRESS; and Randolph AFB, HQ ATC, Dir. Environmental Planning (HQ ATC/DEV).

(c) Image Analysis Software - Computer manipulation and interpretation of remotely-sensed images and development and maintenance of image processing systems are taking place mainly at Tyndall AFB, AFESC; Scott AFB, ETAC; Eglin AFB, AD/KRESS; and Randolph AFB, HQ ATC/DEV.

(d) Geographic Information System - Development and maintenance of geographic data processing software is taking place mainly at Tyndall AFB, AFESC; and Scott AFB, ETAC.

(e) Statistical Analysis Software - The development and maintenance of computer statistical analysis techniques take place mainly at Tyndall AFB, AFESC; Scott AFB, ETAC and Eglin AFB AD/KRESS.

Based on the amount of machine-readable data, software development and maintenance in each of these computer systems areas, and the willingness of data base administrators and software developers to distribute and support their programs, each group can be ranked by the potential system support that it could offer to an environmental information network.

Rank 1 Groups. Machine-readable environmental data bases and software needed for all operational environmental applications developed and maintained, willingness to help support an environmental information network, facilities in place and available to support an environmental modeling library and information system.

Rank 2 Groups. Operational environmental computer systems significantly developed; some support facilities available.

Location	Group
Tyndall AFB	AFESC/RDV
Scott AFB	ETAC

Rank 3 Groups - Some elements of environmental computer systems developed; very limited support facilities.

Location	Group
Tyndall AFB	AFESC/DEVC
	AFESC/DEVP
	AFESC/RDV
Scott AFB	USAF ETAC Data Automation
Eglin AFB	AD/KRESS

Rank 4 Groups - Almost no environmental computer system elements in place; no support facilities.

Location	Group
Tyndall AFB	AFESC/DEVN
Scott AFB	HQ AWS/DNXP
	USAF ETAC/ENB
	USAF ETAC/DNS
Randolph AFB	HQ ATC/DEV
Robins AFB	HQ AFRES/DCS
Wright-Patterson AFB	HQ AFLC Environmental Planning

9. ENVIRONMENTAL SCIENCE AND PLANNING FUNCTIONS

A table in the questionnaire asked which environmental science and planning functions were performed and how frequently. This table was analyzed (see Appendix E Table 15), and a summary was prepared to display the relative frequency of different science and planning functions. The number of people doing a particular function were multiplied by a weighting factor corresponding to the frequency of performance (few 1, some 2, many 3) and the products were added to form a frequency rank reflecting both the number of people performing a function and the frequency with which they perform.

TABLE C-8. FREQUENCY OF PERFORMANCE OF ENVIRONMENTAL SCIENCES AND PLANNING FUNCTIONS.

Environmental Science and Planning Functions	Frequency Rank Higher Number = Greater Frequency
Manual data interpretation	317
Preparation of environmental impact statements	297
Preparation of regulatory reports	225
Air quality analysis	221
Field survey	213
Automated data interpretation	186
Collection of monitoring data	184
Collection of data on airport operations	171
Economic data collection and forecasting	162
Change detection and trend analysis	158
Preliminary site design	154
Meteorological analysis	141
Need analysis for Air Force facilities	130
Detail site design	129
Land use planning	129
Post-construction monitoring	127
Interpretation of special ordinances	121

TABLE C-8. FREQUENCY OF PERFORMANCE OF ENVIRONMENTAL SCIENCES AND PLANNING (CONCLUDED).

Technical testimony	118
Location analysis of Air Force facilities	102
Energy consumption analysis	63
Supervision of construction	18

In applications the primacy of manual data interpretation suggests that increased automation may dramatically increase productivity. The importance of tools to aid the preparation of environmental impact statements and regulatory reports is confirmed. Field survey and monitoring stand out as important.

This list has some overlap with the list of environmental activities (Table C-6). The former list was completed by managers, this (Table C-8) by technical staff, and the context of the questions was somewhat different. Some key similarities, for example, the importance of environmental impact statements, tend to validate the analysis techniques and strengthen the conclusions.

10. ENVIRONMENTAL DATA

The summary (Table C-9) shows the sample formal environmental data bases, now used by the Air Force, ranked by the number of groups using each data base.

TABLE C-9. DATA BASES USED IN USAF ENVIRONMENTAL APPLICATIONS.

Data Base	Importance Rank Higher Number= Greater Importance
o GWC and ETAC. Meteorological data base maintained and distributed by the USAF Environmental Technical Applications Center5 (ETAC)	6
o ETIS/CERL. Environmental data bases maintained by the U.S. Army Construction Engineering Research Laboratory (CERL), mostly in the Environmental Technical Information System (ETIS)	4
o Other US EPA data bases. Environmental data bases other then those mentioned elsewhere maintained by the Environmental Protection Agency (EPA)	3

TABLE C-9. DATA BASES USED IN USAF ENVIRONMENTAL APPLICATIONS (CONCLUDED).

Data Base	Importance Rank Higher Number= Greater Importance
o AQAM Data. Air Quality Assessment Model (AQAM) data collected and maintained by AFESC	2
o Other USAF Data Bases, USAF Environmental data bases not mentioned elsewhere.	2
o USAF Noise Data Base	1
o USAF Bird Strike Data Base	1
o USAF Range Planning Data Base	1
o USAF STORET Data Base (Water Quality)	1
o USEPA NAWDEX/WATSTORE Data Base (Water Quality)	1
o USEPA SAROAD Data Base (Air Quality)	1
o USEPA NEDS Data Base (Air Emissions)	1
o EOP DIDS Data Base (Environmental and Socioeconomic)	1
o US Census Data Base	1
o Other Federal Civilian Data Bases	1
o State Data Bases	1
o Proprietary Data Bases	1

A table in the environmental science and planning section of the questionnaire invited respondents to record which environmental data was used and the frequency of use. This table was analyzed (see Appendix E, Table 15), and a summary was prepared to display the relative frequency of use of different data types. The use of data by each group was noted. The numbers in each group recording a particular data use were multiplied by a weighting factor corresponding to the magnitude of use (a little-1, some-2, a lot-3) and the products were added for each data. The magnitude ranking reflects both the numbers of people using data and the amount of use by each person.

TABLE C-10. TYPES OF DATA USED IN USAF ENVIRONMENTAL APPLICATIONS.

Environmental Data Types	Importance Rank Higher Number= Greater Importance
Preliminary engineering data	245
Air quality data	221
Census data	204
Meteorological data	141
Drainage maps	137
Water quality data	134
USGS Topographic maps	129
Land use maps	129
Infrastructure data	117
Geology and water table data	111
Zoning maps	108
Soil maps	107
Flood plain maps	87
Coastal zone and wetland maps	79
Endangered species data	76
Park and open space maps	72
Aerial photographs	68
Tax record data	62
Wildlife range maps	52
Historic resource data	51

The beginning content of an environmental data base is suggested by Table C-10. The importance of air data was elected but the high importance of census data was not.

11. ANALYTICAL TOOLS

Twenty-nine respondents (40 percent) used analytical tools for environmental calculations and plans. The distribution in this sample among different kinds of analytical tools is shown in Table C-11.

TABLE C-11. USE OF ANALYTICAL TOOLS.

	A lot	Some	None
Manuals, charts, etc.	18 (62%)	10 (34%)	1 (45%)
Desk Top units	13 (45%)	11 (38%)	5 (17%)
Minicomputer*	8 (28%)	9 (31%)	12 (41%)
Mainframe Computers*	8 (28%)	9 (31%)	12 (41%)

*Identical figures do reflect identical use of mini and mainframes. Varied patterns coincidentally produce the same figures.

Table C-12 shows the number of groups needing certain types of environmental analyses and the average desirability of features within each analysis (See Tables E-20 through E-25).

Almost all (86 percent) sample groups did their environmental analyses in-house, 38 percent used private consultants, and 28 percent other Air Force groups. Table C-12 shows the kinds of environmental analyses desired by Air Force groups. Each kind of analysis (e.g., hydrologic analysis) was divided in the questionnaire into features, or analytical elements (e.g., capability to analyze large watersheds). The number of people indicating one of four levels of need for each feature is recorded in Table C-12 (Mandatory, Highly Desirable, Desirable, Locally Desirable).

The average desirability rankings were obtained by adding the products of the numbers of people in each category of desirability multiplied by the desirability weighting, and dividing the total by the number of features. This gave a measure of the combined need for all the analytical features in each subject area. The percentage desirability shows what percentage the desirability rank is of the maximum possible desirability (i.e. all respondents voting all analytical features mandatory).

This table establishes that all application areas have analytical features which are mandatory to satisfy Air Force needs. A successful model library must address all seven applications areas and at least an average 43 percent of the application features listed in the questionnaire. Almost all (93 percent) of analysis features listed were considered essential, highly desirable or desirable by the sample. Chemical spill, industrial hygiene and air quality analyses in particular are essential for Air Force missions.

TABLE C-12. SUMMARY OF FEATURES NEEDED FOR ENVIRONMENTAL ANALYSIS.

APPLICATION AREA	NUMBER OF FEATURES IN CATEGORY				TOTAL NUMBER OF FEATURES IN CATEGORY	AVERAGE	
	DESIRABILITY WEIGHTING					DESIRABILITY RANKING ALL FEATURES	PERCENTAGE DESIRABILITY ALL FEATURES
	X4 MANDATORY	X3 HIGHLY DESIRABLE	X2 DESIRABLE	X1 LOCALLY DESIRABLE			
HYDROLOGY	1	7	4	1	13	2.6	65%
CHEMICAL SPILLS	5	0	0	0	5	4.0	100%
GROUND WATER	7	3	2	0	12	3.4	85%
WATER QUALITY	4	10	10	4	28	2.8	70%
NOISE	6	5	3	2	16	2.9	73%
AIR QUALITY	8	1	0	0	9	3.9	97%
INDUSTRIAL HYGIENE	8	0	0	0	8	4.0	100%
TOTAL NUMBER	39	26	19	7	91	3.4	85%
TOTAL PERCENTAGE	43%	29%	21%	8%	100%	84%	---

- o In surface water analysis the most important features are continuous simulation in real time of large and small watersheds.

- o In air quality analysis the most important features are single-element models and crosswind dispersion in a time scale of hours to days.

- o In water quality analysis the most important features are analysis of coliform, dissolved oxygen, water temperature and phos'orous levels and the impact on these variables of point and nonpoint pollutant sources in lakes, reservoirs, rivers and streams.

- o In noise analysis the most important feature is aircraft noise simulation.

- o All chemical spill analysis features are important; toxic chemical spills on land were marginally the most important.

- o In groundwater analyses analytic and finite-element solutions to steady- and non-steady-state conditions were marginally the most important features.

- o In industrial hygiene models all features are essential.

About half (46 percent) of the software used by the Air Force personnel sampled for environmental analysis purposes is developed in the Air Force. Twenty-three percent is developed in the group needing the software, 23 percent in another USAF group and 12 percent of the analysis software comes from the U.S. Environmental Protection Agency (EPA). Twelve percent comes from various universities, 8 percent from the Soil Conservation Services (SCS), 6 percent from commercial time-sharing systems, 4 perecent from the U.S. Army Corps of Engineers Hydrologic Engineering Center (HEC), 4 percent from private sources, and 2 percent each from the Integrated Civil Engineering System (ICES), HEEP and CEPA.

12. ENVIRONMENTAL MODELS

Twenty-two Air Force groups (30 percent) of the sample occasionally use environmental simulation models. The pattern of use is shown in the following list (the more groups using a model, the higher the ranking).

TABLE C-13. USAF USE OF ENVIRONMENTAL MODELS.

Model	Importance Rank Higher Number= Greater Importance
AQAM Air Quality Assessment Model (Source USAF)	4
PTMAX Point Source Maximum Concentration air dispersion model (Source EPA)	4
PTDIS Point Source Dispersion air dispersion model (Source EPA)	4
PAL Point, Area and Line Source air dispersion model (Source EPA)	3
PTMTP Multiple-Point Source and Receptors air pollution model (Source EPA)	2
VALLEY Air pollution model for complex terrain (Source EPA)	1
CRSTER Single source air dispersion model (Source EPA)	1
HACS Hazard Assessment Computer System (Source U.S. Coast Guard)	1
SAM Spill Assessment Model	1
RAM Robert A. McCormick rural and urban air pollution models	1

Interviews revealed that the use of models would be significantly greater than this, but that limited understanding of models and access to them prevented wider application.

13. KEY USER-SELECTED ISSUES

The final section of the questionnaire invited general comments free of any question structure. The questionnaire required approximately an hour to complete and, in many mission areas, the structured questions covered the issues of concern rather thoroughly. Only 65 percent of the sample chose to add additional comments. Comments varied from one-line observations and short lists of key issues to multipage essays covering many issues. All these comments are included verbatim in Appendix E. These comments can be considered

key issues of prime concern to the users. The issues in these comments can be isolated and summarized and the occurrences counted. The final comments fall into general subject areas:

- o General Environment
- o Environmental Information Systems
- o Environmental Data
- o Environmental System Applications
- o Envirornental System Support and User Staff

TABLE C-14. KEY USER-SELECTED USAF ENVIRONMENTAL ISSUES.

General Environmental Issues	Importance Rank Greater Number = Greater Importance
The Air Force needs a better support system for environmental information.	23
Air Force users and producers of environmental information and analyses, and producers outside the Air Force, with capabilities needed by the Air Force, should be linked in an information network which gives users maximum access to needed information resources.	18

Environmental Information System Issues Desired System Characteristics	Importance Rank Higher Number = Greater Importance
Easy, quick access to remote data and capabilities.	12
Easy access to system, quick to learn, user-friendly.	8
System can transfer data simple from place to place.	6
System informs users of needed technical developments. Who is doing what, where and how can needed access be gained?	6
System development user-guided to address real needs.	5
Distributed machine intelligence, smart terminals, desk-top microcomputers, programmable calculators.	5
System can transfer software simply from place to place.	4
Dedicated computer for system development and support center.	3
Coordination with existing environmental resources in Air Force and elsewhere.	3

TABLE C-14. KEY USER-SELECTED USAF ENVIRONMENTAL ISSUES (CONTINUED).

Environmental Information System Issues Desired System Characteristics (Continued)	Importance Rank Higher Number = Greater Importance
Interactive and batch computer access.	3
Fast-to real-time system access especially in emergencies.	3
User training available.	3
User support available.	3
User documentation available.	3
Distributed computer capabilities at base level available.	2
Software quality control, and bug-fixing.	2
Flexible, user-friendly data base management.	2
Electronic mail box capabilities.	2
Graphic capabilities.	2
Widespead access to cheap terminals.	2
Coordination with existing and planned resouces.	2
Several levels of security.	2
Software maintenance and enhancement.	1
On-line system use tutorials.	1
Modularity to allow flexible growth.	1
Growth from existing resource base.	1
Use of system cuts costs.	1
Reduction of resource duplication.	1
Modest start in real application.	1
Provide for hand calculators and microprocessors.	1
Incorporate successful elements of Army ETIS system.	1
24-hour access.	1
User-programming facilities.	1
Reliable operation.	1
Low-cost hardware.	1
Low-cost operation.	1
Nationwide availability.	1
AFESC support center.	1

Environmental Data Issue	Importance Rank Higher Number = Greater Importance
Ready access to well-maintained environmental data.	10
Easy, fast data transfer.	6
Rapid, accurate data base administration and update.	3
Meteorological data.	3
Flexible, user-friendly data base management.	2

TABLE C-14. KEY USER-SELECTED USAF ENVIRONMENTAL ISSUES (CONTINUED).

Environmental Data Issue	Importance Rank Higher Number = Greater Importance
Secure use at several classification levels.	2
Standardized data.	2
Central data base coordination with adequate authority.	2
Coordinate data base structures.	1
Indexing and archiving.	1
Toxicology data.	1
Water quality data.	1
Air quality data.	1
Health data.	1
Remotely sensed data.	1
Access to proprietary data.	1
X-ray survey data.	1
Ionized radiation data.	1
Nonionized radiation data.	1
Hazardous waste data.	1

Environmental System Application	Importance Rank Higher Number = Greater Importance
Environmental data storage, transfer, management, retrieval and display.	15
General environmental contact information (who is doing what, where and how to get it if needed).	6
Up-to-date technical index and bibliography.	6
Environmental modeling library.	5
Environmental regulatory information system.	5
Toxic spill and exposure modeling.	3
Emergency response procedures.	3
Tools for preparing environmental impact statements.	2
Comprehensive base planning.	2
Statistical analyses.	2
Air quality modeling.	1
Water quality modeling.	1
Weather modeling.	1
Visibility modeling.	1
Noise modeling.	1
Ionizing radiation modeling.	1
Land use analysis.	1
Legal compliance analysis.	1
Regulatory paperwork.	1

TABLE C-14. KEY USER-SELECTED USAF ENVIRONMENTAL ISSUES (CONCLUDED).

Environmental System Application (Continued)	Importance Rank Higher Number = Greater Importance
Gaming and what if capabilities.	1
Hazardous waste handling and disposal procedures.	1
Location analysis.	1
General environmental applications.	1
Aircraft and missile emission analysis.	1

Environmental Information System Support and User Staff Issues	Importance Rank Higher Number = Greater Importance
System support staff should be stable, with low turnover, allowing a corporate memory to grow. With high military turnover rates this implies some civilian support.	2
System support staff should be technically very competent.	2
System support staff should have sufficient authority to ensure necessary coordination.	2
System innovations should require little user time of resources.	1
System operation should be increasingly user-supported.	1
System enhancements should demonstrate increased user productivity and cost savings.	1

SECTION VI

U.S. AIR FORCE ENVIRONMENTAL NEEDS AND CAPABILITIES

The analysis of survey answers outlined in Section IV and shown in full in Appendix E reveals many Air Force environmental needs. Some needs are apparent on first reading, e.g., the need for better access, storing, retrieving, transferring, and sorting of data. Deficient environmental modeling and data are the greatest needs, but other needs are also identified. Lack of access to machine-readable data bases, computers and software, plus use of data and analyses, are primary barriers.

Further reading of the survey indicates that the Base Bioenvironmental Engineers and Base Environmental Planners are the environmental front-line staff of the Air Force. These personnel have the most direct responsibility to fulfilling the Air Force environmental pledge. They plan, monitor and manage the environmental effects of Air Force activities and represent the Air Force to neighboring communities.

In the armed services with the highest technology, these key groups have almost no access to machine-readable data, computers, or software. This excludes the base policymakers from increasing amounts of environmental understanding, information and analysis tools, and seriously limits the extent and speed with which support can be given by specialist groups to base level staff.

This survey shows both the need and wish for facilities in the Air Force similar to the Army computerized environmental information system (ETIS), which is used extensively by Army bases.

The Air Force has large amounts of machine-readable data. The AWS and ETAC meteorological data bases, in real time and historical archive, for example, are without equal. There is environmental software available in the Air Force, such as environmental analyses at AFESC and weather forecasting at ETAC. There are computers available for Air Force environmental applications at Tyndall, Eglin and Brooks AFBs. There is an existing plan for a standard environmental data base (COHP) on standard minicomputers at base level throughout the Air Force from OEHL at Brooks AFB. Transfer of information, procedures, ideas, news and support from existing capabilities in the Air Force and elsewhere is needed.

Air Force environmental needs can be summarized into four large, simply stated requirements:

- Access to better environmental data.
- Better environmental models.

- Better computer systems.
- Better information networks which connect people and computers.

Available resources exist in the Air Force and elsewhere which could address all four of these needs. This section documents the needs indicated by the survey and outlines some of the capabilities which are or could be available to address the established needs by better coordination.

1. USAF ENVIRONMENTAL NEEDS

a. Environmental Data Needs

Data-related tasks are the most frequent in Air Force environmental missions. In order of magnitude, the most common tasks are data collection from other agencies, data distribution to other agencies, data quality control and verification, data update and maintenance, data formatting and integration, monitoring and mapping.

Improved data procedures were also stated as the greatest needs. In order of magnitude the greatest needs are better data collection procedures from other agencies, better mapping, better survey, better data distribution, better data quality control and verification, better monitoring and better data formatting. (See Table C-4). Good data bases and data manipulation techniques were the two most desired characteristics of computer systems. (See Table C-7, and Figure C-5).

Manual data interpretation is the most common Air Force environmental application. The most frequently used kinds of data in Air Force environmental applications are preliminary engineering data, air quality data, census data, meteorological data and drainage maps. (Table C-10.)

The desire to have better data access was the most frequent general environmental need stated in comments (see Table C-14). Better access and data transfer techniques were the most common data needs stated in comments (see Table C-14). Better environmental data storage, transfer, management, retrieval and display were the most commonly stated system needs in the comments.

Currently, about one-third of all groups use machine-readable data bases of which only 11 percent were judged to be useful. Thus, the level of activity involving the accessing of machine-readable data bases is low and those machine-readable data bases which are available are not perceived to be useful to almost 90 percent of the users. This may result from the lack of coordination among the various groups involving definition and implementation of standards. Of those groups that build machine-readable data bases, only 4 percent use a standardized system.

It may be concluded that there is no reluctance on the part of most groups to use general data sources - whether they are machine-readable or not. Where data bases were available, almost 80 percent of the groups use them. Of all the groups, almost 90 percent use data bases and 60 percent actually share data. It may be concluded that data constitute a major resource which must be available for environmental work. Further, the various groups are ready to use data from a variety of sources. The current machine-readable data bases do not receive widespread use due to a variety of reasons including: lack of available machine-readable files, the lack of standards or the lack of hardware resources including terminals and inadequate disk capacity.

b. Environmental Modeling Needs

Simulation modeling is the most frequent Air Force environmental application activity in the sample (see Table C-4). The need for better modeling capabilities was the most common application deficiency recorded (see Table C-5).

The most frequently used models are air quality simulations. Chemical spills are also important. (see Table C-13).

An environmental modeling library was the environmental application most commonly requested in the comments (see Table C-13).

Seven most widely encountered environmental applications areas were identified in the questionnaires (e.g. hydrology, chemical spills, groundwater, water quality, noise, air quality and industrial hygiene). The questionnaire included 91 possible desirable features to be contained in these seven areas. The results indicated that 72 percent of the features are either most required or highly desirable. The order in which the various applications areas are most required was: chemical spills (100 percent), industrial hygiene (100 percent), air quality (90 percent), groundwater (60 percent), noise (40 percent), water quality (14 percent) and hydrology (8 percent).

Access to environmental models is limited among the various groups queried in this study. A quick tally indicates the following:

Application Area	Number of Models Available	Number of Groups Having Models in Applications
Air Quality	11	7
Chemical Spills	3	1
Hydrology	4	0
Water Quality	1	0
Groundwater	2	0
Noise	1	1
Total	22	9

Thus, the principal use of environmental models is concentrated in air quality, chemical spills. No activity is indicated for the very important hydrological area (where many excellent computer models are available), the water quality or groundwater areas. It may be noted that computer models applicable to the water quality, especially the groundwater areas, are complex and widely variable. They require extensive data to drive them which are often not available.

Notwithstanding these limitations, the basic tools necessary for environmental assessments are represented by the ability to perform analysis within all application areas named. The FAA guidelines for EIS (relating to airport and aircraft operations) name these and others in citing standards for environmental evaluation. It is felt that the use of models in these areas is at a minimal level for the groups evaluated.

Dissemination of information and distribution of environmental models are limited among the groups queried. Only about one-fourth of all groups use any of the models which have traditionally proven to be the most effective outside sources of application software. The ranking order and the number of groups using these models are summarized as follows:

Order	Coordination Model	No. Groups	Percent of All Groups
1	Internally Developed	12	60
2	University Sources	9	45
3	USAF Facilities	7	35
4	Federal Government	7	35
5	Private Consultants	5	25
6	User Groups	3	15
7	Time Sharing	3	15

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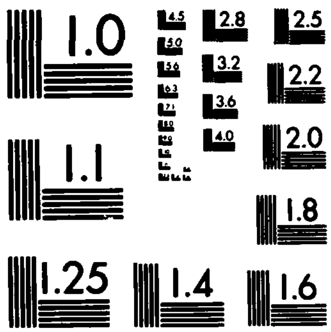

MICROCOPY RESOLUTION TEST CHART
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Thus, about 60 percent of all groups develop their own models; an average of 25 percent of the outside service models is used. The most cited reason (65 percent) for this propensity to development in-house is the capability is not available elsewhere. However, responses indicate an extremely sparse use of existing models and a lack of knowledge of existing environmental models most used in the field. Therefore, the level of coordination between groups, concerning the availability and use of environmental models, is grossly suboptimal.

c. Computer Access Needs

More access to computer hardware was the second most commonly expressed resource needed (see Table C-6).

Increased availability of interactive terminals was the most commonly stated computer need; adequate memory and disk access were also indicated as being very important (see Figure C-6).

Only 28 percent of the sample had regular access to mainframe or minicomputers for environmental applications and 41 percent had no access (see Table C-11). Ease and speed of computer system access were the most common needs raised in comments (see C-14).

The use of environmental models and data bases is constrained by the availability of compatible hardware. The hardware now in place throughout the AF facilities queried can be categorized into three types (which can be further broken down by vendor and model):

Computer Type	No. Systems	No. Vendors	No. Models
Mainframe	7	4	5
Minicomputer	2	1	2
Micro Units	3	1	2
Total	12	6	9

Thus, even though a total of 12 computer systems are available for environmental use, they exist in the form of 9 models manufactured by 6 vendors.

The most pervasive problem which prevents the spread and use of comprehensive scientific application programs (in this case environmental models) is the lack of portablility of these programs between machines. Generally, the migration of comprehensive software becomes more difficult and the hardware capability diminishes. It is more difficult to transfer a program from a mainframe to a miniframe and much more difficult, if not impossible, to connect a program from a minicomputer to a microcomputer (desk).

d. Network Needs

No established environmental technology transfer or information network, automated or otherwise, exists in the Air Force and 96 percent of the sample thought that transfer or networking would be essential, very useful, or useful (Figure C-4). Lack of time and knowledge is the greatest barrier to exchange of environmental information (Figure C-5). Activities that would support environmental information networks are presently among the least frequent and are considered highly deficient (Table C-4). More contact is the second most desired resource to overcome deficiencies (more people is the first) (Table C-6). Computer networking is considered important, though not of primary importance (Table C-7).

Better technical contact was one of the most common needs stated in the comments (Table C-14). Data networking was the most common system need stated in the comments and the second most common data need after access (Table C-14).

Providing a full array of environmental programs to all groups would probably be extremely difficult due to the differences that exist between hardware. This is especially true of microsystems where memory, disk capacity and often a compatible language (usually FORTRAN) are not adequate or available. One way of overcoming such problem is to link up with a standard network such as ARPANET, which is currently being utilized by Eglin AFB, Scott AFB and Wright-Patterson AFB as primary subscribers. Another manner which is currently being used with muc'. effectiveness is to link various standard minisystems into a network. This often proves to be most efficient because costs of distributed minisystems are rapidly decreasing and the vendors are increasingly providing high level systems software necessary to allow the access of common data banks by multiple systems.

2. PRESENT USAF ENVIRONMENTAL CAPABILITIES

The environmental capabilities needed by the Air Force include general information, data, analysis techniques and tools, user support and networking and communication. The existing Air Force capabilities are not integrated into a coordinated support structure. This section lists the most important environmental Air Force capabilities and describes briefly what is available. The list is not inclusive and other capabilities wil be added as they are discovered in this study.

a. HQ Air Force Engineering and Services Center (AFESC)

The Air Force Engineering and Services Center (AFESC) at Tyndall Air Force Base has the prime environmental Air Force capabilities in the Engineering and Services Laboratory (AFESC/ESL) and the Environemental Planning Directorate (AFESC/DEV). The Environics

Division in ESL (AFESC/RDV), the agency funding this study, is responsible for Air Force environmental research and development. AFESC/RDV is the lead laboratory and laboratory focal point (LFP) for Air Force Systems Command (AFSC) environmental research and coordinates this work with other DOD and federal agencies.

The staff of the Environics Division consists of 26 engineers, chemists, and other scientists, and 10 technical assistants and administrative people. Of these, 19 have Ph.Ds or Master's Degrees. Research funds exceeding $2.0 million per year are spent on research, both in-house and in joint efforts with universities, commercial research organizations, and other government organizations. The Environmental Sciences Laboratory of the Environics Division performs in-house research in atmospheric and aquatic chemistry and pollution control technology. Specialized equipment includes a computer-controlled Fourier Transform IR Spectrometer coupled to a Long Path Smog Chamber for photochemistry studies of AF fuels and chemicals, and a gas chromatograph/mass spectrometer/data system for complex reaction product identification and measurement. The laboratory can analyze trace organics and metals in natural water and ambient environments, and a portable field laboratory is available for onsite studies at other Air Force installations. The control processes laboratory is equipped to evaluate bench scale chemical and physical processes for control of toxic industrial wastes. Biological reactors are available in the control processes laboratory to evaluate the effects of AF chemicals and fuels on domestic sewage treatment plants.

Environmental Quality and Facilities Energy Research and Development is conducted in four task areas:

(1) Environmental Chemistry and Monitoring of Air Force Pollutants

The objective of this task is to derive information on the transport and chemistry of pollutants resulting from Air Force operations and to develop new technology to detect, identify and quantify pollutants.

(2) Pollution Control Technology

The objective of this task is to develop methods to control air and water pollution originating from Air Force operations to assure regulatory compliance.

(3) Facilities Energy and Resource Conservation

The objective of this task is to provide technology to develop Air Force alternate energy resources and attain stated energy policy goals. Increased costs and current dependence on

foreign petroleum require the development of renewable energy sources such as solar, wind, geothermal and biofuels.

(4) Environmental Assessment Technology

The objective of this task is to develop modeling techniques to assess the impact of Air Force base air emissions and water discharges on the surrounding environment. Environmental models are needed to predict whether significant environmental degradation may result from present and future Air Force operations. Techniques are being developed to combine emission factors from many sources, to model transport mechanisms between the sources and receptors, and to predict environmental impact based upon available criteria.

AFESC/RDV has environmental data bases, documented simulation models and other analytical techniques, laboratory facilities, highly skilled technical staff and a mandate to assist experimental application projects. The early stages of establishment of an environmental modeling library and information network are essentially research and development and AFESC/RDV is the most suitable first location in the Air Force.

The Directorate of Environmental Planning (AFESC/DEV), an extension of the Environmental Division (HQ USAF/LEEV), provides guidance and assistance to Air Force major commands and bases on environmental matters which affect the daily operation of the Air Force mission and the Air Force community. Program activities include environmental impact analysis, pollution abatement, bird/aircraft strike hazard (BASH), reduction pest management, hazardous and toxic substances control, socioeconomic analysis, and quality of life considerations. A multidisciplinary staff aids installation and major command personnel in preparing and processing environmental documents and assists them in implementing programs in environmental protection and assessments, community planning and natural resources management.

The Environmental Protection and Assessments Division focuses on protecting, restoring, and enhancing the quality of the environment to avoid or minimize adverse environmental consequences for all Air Force activities. As the Air Force's lead agency for environmental matters, this Division ensures that all U.S. Air Force proposed actions are evaluated for environmental impact and that they comply with provisions of the National Environmental Policy Act. On-line computerized environmental impact simulation modeling and data retrieval capabilities are available for socioeconomic and biophysical analyses, as well as rapid and easy access to abstracts of state and Federal laws, regulations, and standards. The Divison also manages the U.S. Air Force environmental pollution abatement

programs. This responsibility is carried out through the development of interpretive guidance and monitoring of Air Force performance in meeting environmental quality standards.

The Community Planning Division guides and assists implementation of base comprehensive planning in the Air Force. This effort seeks wider application of all aspects of community planning to the solution of Air Force problems and the conservation of Air Force resources. Major efforts are underway to improve the duty performance and quality of life for Air Force people and the surrounding community. For example, the Air Installation Compatible Use Zone (AICUZ) program shows community officials and local residents the levels of aircraft noise and accident potential zones surrounding the base. This is intended to help communities plan compatible land uses and reduce encroachment pressures on the Air Force installation.

The Bird/Aircraft Strike Hazard (BASH) team visits airfields and recommends actions that can be taken to reduce the potential of bird strikes, a very important part of the Air Force's flying safety effort. Other important programs include pest management, endangered species and historical/archaeological/cultural site perservation.

Once the experimental aspects of the proposed environmental modeling library and information network have been worked out, AFESC/DEV would be the most logical place to establish an operational network coordination node which would pursue system development and maintenance and user support.

b. USAF Occupational and Environmental Health Laboratory (OEHL)

The Occupational and Environmental Health Laboratory at Brooks Air Force Base is also a key environmental capability in the Air Force. The mission of USAF OEHL is to provide professional consultation, specialized laboratory services and operational field support to assist the Air Force in meeting its worldwide responsibilities in the management of occupational, radiological and environmental health programs.

USAF OEHL uses a multidisciplinary approach in providing consultation to Air Force organizations concerned with environmental problems. To achieve this end, the OEHL is staffed by military and civilian scientists, chemists and technicians professionally trained in such diverse fields as agronomy, animal and plant physiology, computer science, all aspects of engineering, entomology, environmental law, health physics, medicine, limnology, medical administration, meteorology, public health and environmental toxicology. Most of these scientists and technicians possess advanced

academic degrees and are recognized and accredited by their respective professional organizations.

(1) Environmental Quality Sampling

USAF OEHL provides the following environmental sampling services:

- o Guidance on sampling requirements, equipment and techniques used in establishing water pollution control programs.
- o Water pollution surveys at Air Force installations to determine the need for, or the effectiveness of, waste water treatment processes.
- o Consultation in problems with drinking water sources and supplies.
- o Ambient air monitoring for conformance to national ambient air standards.
- o Emission tests for compliance with air quality directives.
- o Quantitative and qualitative chemical analysis of samples taken by Air Force installations in support of local pollution control programs.
- o Specialized environmental monitoring equipment on loan basis to USAF bases worldwide.

(2) Environmental Toxicology

One of the primary responsibilities of USAF OEHL is to assist in evaluating the environmental impact of Air Force activities. Some of the services provided by USAF OEHL are:

- o Toxicity studies including bioassays.
- o Studies to determine the physical, chemical and physiological environmental health stresses on animals resulting from Air Force activities.
- o Biodegradability and treatability studies on compounds used by the Air Force.
- o Consultation in the use and disposal of pesticides.

(3) Occupational Safety and Health

The protection of personnel in their work environment is of paramount importance to the USAF. To achieve this goal, USAF OEHL provides the following services:

- o Onsite evaluation of industrial work areas for occupational hazards.
- o Design and evaluation of military programs and engineering controls.
- o Measurement of ambient equipment on a loan basis to USAF bases worldwide.

- o Specialized monitoring equipment on a loan basis to USAF bases worldwide.
- o Reviews and comments on all legislation and standards that affect Air Force programs.
- o Quantitative and qualitative chemical analysis of samples taken by Air Force installations in support of local programs.

(4) Radiation Hazard Detection

USAF OEHL provides consultative services to Air Force organizations in all aspects of radiological health including:

- o Onsite radiation protection surveyss of medical, dental and industrial radiological facilities.
- o Operation of the USAF Personnel Dosimetry Program.
- o Complete radioanalytical services to evaluate the radioactivity content of a wide variety of environmental, biological and industrial materials.
- o A whole body gamma spectroscope capability.
- o Consultation of equipment, techniques and procedures for evaluting all types of radiation emitters.

(5) Data Repositories

USAF OEHL maintains and operates automated repositories of information for use by the USAF. Some of these areas of information are:

- o Occupational radiation exposure records.
- o Radiation source characteristics.
- o Environmental pollution monitoring.
- o Portable water analyses.
- o USAF Plutonium Deposition Registry.

(6) Additional Services

This Laboratory has a legal advisor with specialized education and training in environmental law. The USAF OEHL legal advisor provides specialized consultation to Air Force personnel responsible for legal aspects of occupational and environmental management programs.

The USAF OEHL Occupational Health Physician, who is also certified in Aerospace Medicine, provides consultation in the prevention, diagnosis and treatment of occupationally related illnesses and injuries.

An Occupational Health Branch has been established as part of the Consultant Services Division. This Branch is responsible for developing a means of promulgating guidance for the

implementation of a uniform occupational health program in the USAF. Objectives of this group include developing programs to comply with OSHA requirements to record data related to health standards and accumulating data essential to future epidemiological studies of the relationship between health, disease and environmental factors.

OEHL is presently proposing two linked programs of direct relevance to this study. These are the Standardized Occupational Health Program (SOHP) and the Computerized Occupational Health Program (COHP). These programs would contain standardized environmental health, occupational health and hygiene data and would be distributed throughout the Air Force at base level. COHP would piggyback on the base-level minicomputers currently being procured for the Hospital Chart of Accounts project. This project, and OEHL capabilities and experience, make OEHL an important supplier of environmental data and services and a strong candidate for an environmental network coordinating node.

c. Air Weather Service (AWS), Global Weather Central (GWC) and Environmental Technical Applications Center (ETAC)

The Air Weather Service (AWS), a worldwide network with a staff of 4700, collects, stores and analyzes meteorological data. In particular, the Global Weather Central (GWC) at Offut AFB collects near real-time meteorologic data and does weather analyses and other weather support services for Air Force bases worldwide. The Environmental Technical Applications Center (USAF ETAC) at Scott AFB and Asheville, NC archives GWC data works a variety of weather models, visibility analyses and air quality calculations. Most important to this project, AWS is a prime source of machine-readable air data.

The Air Force Climatological Data Base is built and maintained at Operating Location A (OL-A)USAF ETAC, Asheville, NC. It serves as the basis for most of the environmental support provided by USAF ETAC to a wide variety of USAF, USA and DOD customers. The data base is retained on magnetic tape with most data sets residing at both USAF ETAC (Scott AFB) and at OL-A. Following are descriptions of the data sets which collectively constitute the Air Force Climatological Data Base.

The climatological data base is composed of two basic types of information: (1) observational data and (2) analyses (certain summaries made from the analyses are also maintained). Worldwide observational data are collected through the USAF Automated Weather Network (AWN) and forwarded from Det 7, AFGWC, Carswell AFB TX, to Air Force Global Weather Central (AFGWC), Offutt AFB NE. There the data are decoded, validated and used in preparation of a multitude of meteorological products for both customer and in-house use. The observational data, together with selected AFGWC analysis fields, are

OL-A, the data are sorted, quality-assured, in some instances reformatted and/or summarized and ultimately merged into their respective data sets. The available data sets, together with their period-of-record (POR), are as follows:

Surface DATSAV. Those surface observations, obtained through the process described above (i.e., AWN TO AFGWC to OL-A), are referred to as the Surface DATSAV file.

Tape Data Family (TDF). TDF-13 (Synoptic Observations) and TDF-14 (Airways Observations) are two additional sources of surface observational data. These data sets were obtained by card punching of hard copy records for periods as early as 1920 through 1970.

AFGWC uses a number of models to produce air analysis sets every 12 hours to support worldwide USAF and USA operations. These include analysis of conditions in the upper air, various boundary layers, the tropopause, surface temperature, snow depth, precipitable water and cloud patterns. Summarized data sets indicating air conditions at low, middle and high levels are also prepared.

d. Directorate of Computer Sciences

The Directorate of Computer Sciences at Eglin AFB provides much support for machine-readable data bases and computerized analysis for Air Force environmental applications. In particular, AFESC uses DCS capabilities for their environmental research.

The Directorate of Computer Sciences provides for the centralized management of the computer resources including equipment, software and services for the Armament Division (AD) and tenant organizations.

Functionally, the Directorate has the management, analytical and technical skills required to satisfy mathematical analyses, digital simulation, management information systems, hardware and software computational data reduction requirements in support of the AD and tenant organizations.

In addition to the technical, mathematical and computational skills, the Directorate has instrumentation to computationally process and display a variety of data. The Centralized Control Facility makes available real-time computational and data support of range safety and engineering analyses of tests performed within the AD test complex. Open-shop programming and interactive terminal support are provided for the large scientific computers.

All computer resources, software and support services may be obtained through the normal staff planning functions of the Division.

The DCS Computer Services Division is responsible for the operation and utilitization of the large-scale scientific and business computers at the Armament Division. This support includes operating and controlling the computer facilities (plus remote terminals) and providing consulting services to all users.

(1) User Services Branch

This branch provides "one-stop shopping" for all users of the scientific computer center. Their main responsibility is to help resolve users' computer-related (software/hardware) problems on the CDC 6600 and Cyber 176 systems. New users should contact this branch to obtain the proper instructions, manuals, and other required information needed to use the scientific computer systems.

This branch provides a broad spectrum of user services with the following major functions:

- Solving hardware/software problems associated with application programs.
- Publishing information concerning computer product usuage, standards and policies.
- Controlling user identification and computer access.
- Monitoring and providing to users and management, computer resources utilization and financial statistics.
- Installing, maintaining, trobleshooting and relocating CRT terminals.
- Issuing, accounting and retrieving for maintenance appropriate portable terminals.
- Providing checkout pool of portable terminals for short-term loan.
- Allocating permanent file disk spaces.
- Maintaining software libraries and abstracts.
- Providing and selling software reference manuals.

Mathematical, Library Routines, and Other Documents

(1) IMSL - International Mathematical and Statistical Library

(2) SSP - Scientific Subroutine Package

(3) BMD/BMDP - Biomedical Statistical Programs

(4) EISPACK - Eigenvalue Routines

(5) FUNPACK - Function Routines

(6) ACSL - Advanced Continuous Simulation Language

(7) CACI - SIMSCRIPT II.5

(8) PLOT10 - Tektronix Interactive Plotting Routines

(9) AG II - Tektronix Advanced Graphing II Plotting Routines

(10) PROGRAM ABSTRACTS - AD Program Library

(2) Open Shop

The Open_Shop concept provides scientific personnel from outside the Directorate of Computer Sciences with a means of solving problems with the aid of the CDC computers. Tasks include: modifying programs, generating production type programs, and converting and checking out programs acquired from outside the Eglin complex on the CDC 6600 and CYBER 176 computer systems. Personnel who have demonstrated a competence in the FORTRAN programming language or System 2000 may write computer programs, provided management within their organization concurs with the objectives and approves the manpower used in the effort.

(3) Base Support Services Branch

The Base Support Services Branch provides the computational services to support the standard base-level management operations of Eglin Air Force Base. Additionally, a centralized data entry facility is available to accomplish data entry tasks in support of the base level operations that require punched cards where no equipment is available in the functional area. A Burroughs 4700 computer system provides batch support to some 100 customers representing some seven MAJCOM's and a civilian contractor. Additionally, 60 terminal devices and four remote line printers provide on-line real-time communications with Accounting and Finance, Civilian and Military Personnel, Civil Engineering, Maintenance and flying activities using standard and MAJCOM (Major Command) unique data systems.

The Eglin B4700 computer support organization is one of the few base-level development centers for base support applications in the USAF. A programming staff of military programming technicians accomplishes developmental and caretaker responsibilities over eight locally developed applications.

Under the Air Force-wide replacement program for the B4700 computer (called PHASE IV), Eglin Base Support Services Branch will become one of 14 regional centers in the USAF, and will support both Eglin and Hurlburt base support and base supply computer missions on VAX 11/780 new generation computer systems. The new computers will be housed in the Directorate of Computer Sciences, Building 380, and the Hurlburt requirements will be satisfied through high-speed communications lines to a remote processing station. Eglin will be the AFSC command lead base for the PHASE IV program.

e. Other USAF Environmental Capabilities

Other, more minor USAF sources of available environmental data and analysis capabilities include 1) Air Force Geophysics Laboratory (AFGL) of Hanscom AFB (which is the center for research and exploratory development involving terrestrial, atmospheric and space environments) and 2) the Rome Air Development Center (RADC) at Griffis AFB (which is presently doing research in graphic and geographic computer capabilities [could directly benefit environmental study]).

There are extensive users and appliers of environmental information, particularly at Major Command levels, who are also repositories of data and capabilities. The most responsive to this study was the Headquarters of the Air Training Command (HQ ATC) Environmental Planning Division at Randolph AFB who have been very innovative and active in the development of databases and computer planning techniques for comprehensive base planning and environmental assessment.

3. OTHER FEDERAL CAPABILITIES AVAILABLE TO U.S. AIR FORCE

A number of agencies and networks or agencies in military and civilian federal departments produce general environmental information data, and various user support analysis techniques of direct relevance to Air Force environmental missions. Some of these are now in use; all are potential for Air Force use and, in general, are used less than their value to what the Air Force suggests. The following list is not inclusive and other relevant capabilities will be added as the study progresses.

a. U.S. Army Corps of Engineers (USCOE) Environmental Capabilities

USCOE has three environmental centers whose work is relevant to Air Force missions and is, or could be, available to Air Force groups: 1) the Construction Engineering Research Laboratory (CERL) and their Environmental Technical Information System (ETIS), 2) the Hydrologic Engineering Topographic Laboratory (ETL) and their Computer-Assisted Photo Interpretation Research (CAPIR).

(1) U.S. Army Corps of Engineers Construction Engineering Research Lab (ECER). The Environmental Technical Information System (ETIS) is an umbrella term for a set of three CERL-developed environmental information retrieval and analysis subsystems. Each subsystem presents and organizes environmental or environment-related information for the perspective of the military's special needs and problems. It allows the Army to assess major environmental impacts which may be caused by Army activities. ETIS is used primarily as an

aid in the preparation of Environmental Impact Assessment and Statements (EA/EISs). The three subsystems are:

(a) Economic Impact Forecast System (EIFS). EIFS helps Army planners predict whether a proposed change in activity will have a significant impact on the local economy. By providing information useful for calculating socioeconomic changes caused by DOD actions, problems can be spotted early in the decision-making process, and alternatives can be considered. EIFS, which has statistics for every county in the nation, can aggregate information to create a profile of any specific economic region and help to assess the magnitude and significance of socioeconomic impacts related to DOD activities.

(b) Environmental Impact Computer System (EICS). Army environmental planners are required by AR 200-2 to explore the consequences of any proposed alteration in activities before writing an EA/EIS. EICS helps the planner meet this responsibility by determining how an Army action affects various aspects of the environment and how to interpret these effects for an EA/EIS. Using project characteristics supplied by the planner, EICS builds a "need to consider" matrix of the likely environmental problems associated with each Army activity. This matrix may then become the basis for the analysis and preparation needed in an EA/EIS.

(c) Computer-Aided Environmental Legislative Data Systems (CELDS). CELDS gives the military planner a fast and easy way to identify the environmental regulatory standards in environmental categories that need to be considered during activity planning or in preparing an EA/EIS. It gives an up-to-date summary of Federal and State regulations and standards related to the environment. CELDS has been developed for use by nonlawyers: output is in the form of abstracts written in layman's language.

The ETIS programs are used regularly by several government agencies: TRADOC, FORSCOM, DARCOM, U.S. Air Force, the Navy and other branches. Use of the system has been increasing since 1978. From July 1978 to June 1980 the average monthly usage was 272; from July 1980 to November 1980, this average had increased to 696 users per month.

(2) U.S. Army Corps of Engineers Hydrologic Engineering Center (HEC). The USCOE Hydrologic Engineering Center (HEC) in Davis, California, has developed a general purpose computer environmental information system called the Spatial Analysis Methodology (HEC SAM).

The HEC-SAM system was initially created to provide an analytical tool and analysis structure that would permit district offices of the Corps of Engineers to provide comprehensive planning assistance to local governmental units in decisions related to flood plain

management. It has evolved into a general purpose spatial-data file-focused procedure with applications in more traditional planning studies in coastal regions as well as river basins. Elements of technical analysis provide the capability to: 1) assess hydrologic, flood damage, and environmental consequences of development situations reflected by alternative land use patterns and water management works, 2) perform wildlife habitat evaluations such as the U.S. Fish and Wildlife Habitat Evaluation Procedure, 3) perform Boolean and overlay analysis, and 4) produce a variety of computer graphics. The planning environment which the system is designed to service encompasses the present mission areas of the Corps with special focus on urban areas.

The general analytical strategy that comprises HEC-SAM is to: 1) assemble and catalog basic geographic and resource information into a computer data bank, 2) forecast and place into the data bank selected alternative future development patterns, 3) formulate an array of management alternatives, 4) perform comprehensive assessments of the development scenarios of interest, and 5) recycle for additional alternatives.

The system has emerged from the pilot study stage. The pilot studies proven HEC-SAM to be sufficiently attractive and powerful enough for traditional Corps survey investigations to make use of major portions of the technology in their studies.

Other HEC environmental software is also of interest, such as the Resource Information and Analysis (RIA). The RIA program is designed to perform selected geographic type environmental analysis by use of a BASE DATA FILE that is a grid cell data bank which contains the grid cell representation of all resource, land use and other grid data needed to perform the desired analysis. The file must be previously created and available for access by the RIA program.

Other HEC environmental software is also of interest, such as the Resource Information and Analysis (RIA). The RIA program is designed to perform selected geographic type environmental analysis by use of a BASE DATA FILE that is a grid cell data bank. The BASE DATA FILE contains the grid data needed to perform representation of all resource, land use and other grid data needed to perform the desired analysis. The file must have been previously created and available for access by the RIA program. RIA can perform four major types of analyses and generate computer printer graphic or tabular displays of the analysis results.

The five major options (referred to as packages) of the RIA program are:

- o Distance Determination Package
- o Impact Assessment Package

- o Locational Attractiveness Package
- o Coincident Tabulation Package
- o Mapping Package

(3) U.S. Army Corps of Engineer Topograhic Laboratory (ELT)

The USCOE Engineer Topographic Laboratory (ETL) at Fort Belvoir, Virginia, is presently developing an advanced photo interpretation and geographic information-handling capability in a program called Computer-Assisted Photo Interpretation Research (CAPIR). CAPIR is building on a geographic information system developed by the Fish and Wildlife Service, Office of Biological Service called AutoGIS (sometimes WAMS and MOSS). CEQ, EPA, the U.S. Forest Service and the Soil Conservation Service are also presently showing interest in AutoGIS (a powerful and flexible system performing geographic data capture, analysis and display and suitable for performing geographic data capture, analysis and display and suitable for many environmental applications). The software runs on Data General and DEC minicomputers. GSC is presently doing a feasibility study for interfacing AutoGIS with the environmental modeling library being developed on a VAX 11/780 for EPA-OTS to allow geographic input and display. All this is public domain software which could be available to the Air Force.

ETL-CAPIR is increasing the sophistication of three-dimensional data capture and storage and studying computer aids to photo interpretation such as pattern recognition. ETL also has a number of other spatial analysis and geo-data manipulation efforts under way.

b. Coast Guard Chemical Spill Models

(1) CHRIS. This is a set of handbooks called Chemical Hazards Response Information System developed by the U.S. Coast Guard and Arthur D. Little, Inc., for the U.S. Coast Guard.

CHRIS provides information on toxic chemicals and means of analyzing the water transport of chemicals in spill emergencies. The sytem consists of four manuals, a regional contingency plan, a hazard-assessment computer system (HACS) and an organizational entity located at Coast Guard headquarters. The four manuals include (1) A Condensed Guide to Chemical Hazards, (2) Hazardous Chemical Data, (3) Hazard Assessment Handbook, and (4) Response Methods Handbook.

(2) HACS. This is a set of 30 algorithms grouped under the name Assessment Computer System developed by the U.S. Coast Guard and ADL for Coast Guard use. Wider distribution of HACS is presently proposed by CEQ through the Chemical Substances Information Network (CSIN).

HACS is perhaps best described as the computerized counterpart of the CHRIS Hazardous Chemical Data Manual (CG-446-2) and Hazard

Assessment Handbook (CG-446-3). It will enable Coast Guard decisionmakers to quickly obtain more detailed hazard evaluations than may be possible via CG-446-3. Graphic output displays show the relationships among spill concentration, thermal radiation, location and time. Furthermore, HACS can be used for emergency discharge advance planning, and the development and testing of improved hazard assessment methods.

Of concern is the evaluation of and response to any dangerous condition precipitated by accidents involving discharged chemicals which can cause, as a potential foreseeable consequence, harm or injury to life and/or property. A chemical discharged (or spilled) on water can create a hazard because of its flammability and/or its toxicity. As the spilled material disperses and/or becomes diluted, the hazard normally decreases and disappears. It is important to know how far and fast the danger of fire or poisoning can spread and at what point the chemical ceases to be harzardous. HAC is built on the mathematical models that were created for CG-446-3 and a number of specialized models developed specifically for computer applications. The design and implementation of HACS has focused on providing rapid and quantitative assessments in response to questions such as the following:

When will the air/water concentrations of a discharged material reach specified level of toxicity at a given location?

When will the air/water concentration return to a specified safe or nontoxic level?

What is the concentration of discharged material at a specified location and time?

The processes of dispersion, evaporation, combustion, etc., (which are associated with the chemicals of concern) are quite complex and depend on many variables, not the least of which is the nature of the chemical. HACS offers a systematic and convenient approach to estimate the type and extent of hazard. The hazard estimate is given in terms of distance and times over which a toxic or flammable concentration of a given chemical may exist in water and in air, and the minimum safe distance between the spill site and people or combustible materials (should the chemical ignite and a fire ensure). HACS presently contains all necessary physical and chemical property data to permit hazard assessments to be performed for 900 commonly shipped chemicals.

c. Environmental Protection Agency

The Environmental Protection Agency (EPA), especially, the Office of Research and Development (ORD) and the Office of Toxic Substances (OTS) has technical information and support services, data, software, and contacts which could help Air Force environmental missions. Some of these are now used by the Air Force, others have potential. Most

immediate to this study are the OTS Environmental Modeling Library and Information System Development, the Chemical Substances Information Network and the STORET (water) and SAROAD (air) data bases.

(1) Environmental Modeling and Information System. EPA-ORD and OTS are developing an operational library of environmental models on a VAX 11/780 minicomputer. The models are linked by a user-friendly front end and are being fully interfaced into an environmental information system called VAX-UPGRADE.

VAX-UPGRADE is developing highly user-friendly command structures, data management and statistical capabilities, and tabular graphic data display. The possibility of introducing a powerful geographic information system is now being studied.

(2) Chemical Substances Information Network (CSIN). EPA-OTS is leading the development of the Chemical Substances Information Network (CSIN), which is of interest to the Air Force for two reasons. First the toxic chemical data and analysis systems present in the network or planned for inclusion would assist the Air Force with several of the greatest environmental needs. Access to these could be gained by a simple membership procedure and is encouraged by EPA. Second, CSIN is doing intensive studies on the technology and politics of networking environmental information in a federal agency. This work could offer many insights and procedures to an Air Force system.

The CSIN concept was proposed as a means of satisfying the Toxic Substance Control Act (TSCA) and similarly oriented legislation. The network presently in development will provide methodology to identify, access and use data and information in diverse information resources. It is to serve the needs of administrators, engineers and scientists in the private sector, academia, and government with responsibilities concerning the development, production, use, environmental fate, regulation, and other aspects of chemical substances. In order to meet these needs, it will offer access to, and the processing of: (1) data and information on chemicals concerning their nomenclature, (2) molecular structure, (3) physical-chemical properties, (4) toxicology, (5) production, (6) control technology, (7) economics, (8) uses, and (9) regulations and guidelines.

CSIN is a new type of data and information resource--not simply another computerized data base into which data from many sources would be gathered, reformatted and reorganized. It is a network capable of offering access to and coordinating the use of autonomous and independently owned and operated resources. In so doing, CSIN offers to users more information and processing capabilities than any one resouce could provide.

A communication network is used to link or provide access to computerized information resources where data relevant to chemical

substances is available. CSIN not only links to independent resources, it also integrate them into coherent problem-solving tools while the resources maintain their independence and autonomy. The computer technology, described as distributed data base management, supports CSIN by providing facilities that allow for the coordinated use of information resources without requiring that the user interact individually with the systems.

(3) Storage and Retrieval System (STORET) and Storage and Retrieval and Aerometric Data (SAROAD). The Storage and Retrieval System (STORET) and the Storage and Retrieval of Aerometric Data (SAROAD) are large, nationwide machine-readable data bases of water and air quality data, developed and maintained by EPA.

d. U.S. Geological Survey National Water Data Exchange (USGS NAWDEX)

The U.S. Geological Survey supports a network of water data users called the National Water Data Exchange (NAWDEX). NAWDEX is of interest to this study for two reasons. First, the data contained in the NAWDEX-WATSTORE database of direct relevance to Air Force applications and accessible through a simple membership procedure. (OEHL is already a member.) Second, the networking experience of NAWDEX could benefit the growth of AFDEX, the Air Force Environmental Data Exchange proposed in this study.

The National Water Data Exchange was established by the United States Geological Survey in 1976 to serve as a national program for cataloging and indexing water data that are available throughout the nation and to improve access to these data.

NAWDEX has been developed as a confederation of organizations working together to improve access to water data. Organizations participate in NAWDEX by becomming members. Membership requires that a Memorandum of Understanding be signed between the organization and NAWDEX which defines the member's general commitment to take an active role in the program, to provide information on its data holding, and to provide data from its holdings in response to requests. Currently, over 190 organizations from the federal, state, local government, interstate, academic, and private sectors participated as members. Four foreign organizations located in Brazil, Canada, and Mexico are also affiliated with the program.

As shown in Figure C-6, members are linked through a central program office located at the United State Geological Survey's National Center in Reston, VA. The central program office provides overall management of the program, develops data-exchange guidelines, develops and maintains central indexes of available data, develops and maintains systems and software needed for operation of the program, and coordinates a nationwide program of user services. Each member

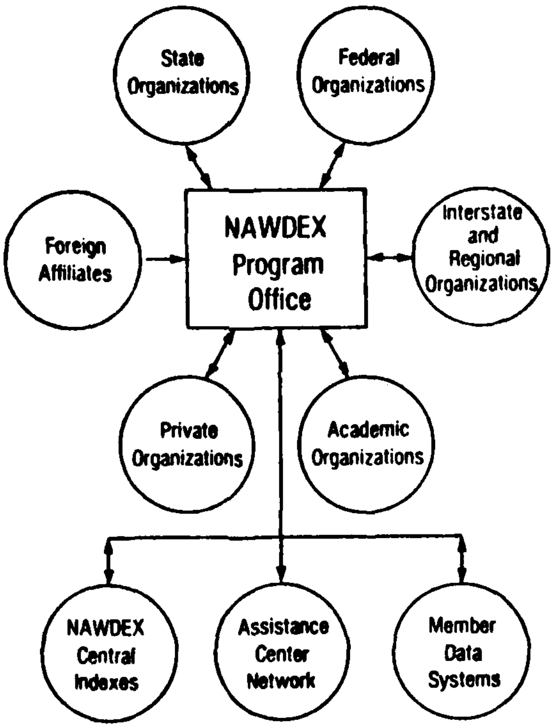

Figure C-6. NAWDEX Organizational Structure.

designates one or more individuals to serve as direct points of contact with the program office on all matters related to NAWDEX, thereby, assuring continuing liaison and reliable communication with all participants in the program. This structure and mode of operation greatly facilitate the ability of NAWDEX to serve as a national focal point for information about available water data.

APPENDIX D

SURVEY PRESENTATION AND QUESTIONNAIRE

SECTION I

SURVEY PRESENTATION

At a workshop held by NASA and the Woods Hole Oceanographic Institute, a group of data users was invited to tell technical designers what they really wanted from an ocean scanning satellite. The representative of the Coast Guard replied without hesitation. His mission required a remote sniffer which could detect illegal narcotics in ships and a sensor for counting fish by species in trawler hulls to check that fishing treaties were being honored.

This questionnaire is prepared by technical designers of environmental information systems to ask you as an Air Force user what you really need from an environmental information network. We encourage you to be as uncompromising in your answers as the Coast Guard. We have no preconceived ideas about the best way to serve the Air Force; we are using this questionnaire to understand your needs.

Your answers will be collected, cross referenced and analyzed to provide an understanding of how the Air Force now uses environmental information and what should be done, or avoided, to improve information services in the future. Some of what you need may be technically difficult but, in this study, it is our job to design and assess techniques that can serve your needs, yours only to tell us of your needs and any ideas that you have for their solution.

An environmental information network is an organization of people, data and data handling tools which solves environmental problems. A network integrates environmental data; stores and distributes environmental databases; collects, develops, maintains and distributes analytical techniques; and supports a network of communication which links the various nodes or centers which collect data, develop data handling techniques or use and apply the information services. These functions may be done at one center or several nodes.

There are many current Air Force uses of environmental data. Most obvious is the preparation of environmental impact statements and, particularly, the use of environmental simulation models to predict the changes that proposed development will cause. The recent concern in the nation that economic and social benefits must be weighed against environmental impacts actually increases the need for sophisticated analytical techniques since the social and economic impacts as well as environmental impacts must be predicted and balanced in an objective cost-benefit analysis.

Another growing use of environmental information systems is optimization analysis for facility siting. In these analyses the requirements and desires of all those involved in a proposed project are applied to a geographic database and the sites which most satisfy all values are identified before land is acquired or any design is begun. These techniques are recent because the complexity of the analysis requires computer hardware and software which has only recently become economically available, but the potential to reduce dispute and speed needed development is great and these techniques are already saving large amounts of expensive litigation.

The technology available to support environmental information networks is improving very rapidly and potential uses are expanding correspondingly. Environmental information is becoming more accurate and up to date and is being stored in more accessible forms. Satellite data is available at increasingly high resolution and the techniques to analyze and interpret remotely sensed data are becoming more powerful and easily available. Large amounts of map data are now being digitized. Computer systems which support environmental analyses are becoming cheaper, faster, more powerful and easier to use.

UPGRADE and DIDS are two systems which originated in the Executive Office of the President which illustrate this development. UPGRADE is the User-Prompted Graphic Data Evaluation System, developed for a group of federal agencies lead by the President's Council on Environmental Quality. UPGRADE contains large amounts of integrated environmental and health data, a variety of data formatting and extraction techniques which allow user selection from the UPGRADE database or additions of user data, and a variety of analysis techniques which can manipulate the data for environmental studies. All of these data extraction and analysis techniques are controlled by simple english language prompting sequences which allow users with no computer skill to use sophisticated automated techniques. "Help" commands make the system self-documenting. Once data has been selected UPGRADE has a variety of analytical techniques. Early uses of UPGRADE emphasized analysis of data drawn from several sources, especially analyzing relationships between environmental and health variables, and this is still one of the strengths of the system. UPGRADE can also make maps of data based on counties, states or watershed units.

DIDS is the Decision Information Display System, a very fast, color mapping system which requires no computer knowledge to use. Very large amounts of national data are stored at state or county level. Recently the world map has been coded and there is a growing amount of international data.

An unskilled user may use DIDS for a variety of geographic data analyses by following sequences of simple multiple choice menus. Any of the many stored variables may be displayed at various scales; national, regional, state or standard metropolitan statistical area. The user may control the partitions,or divisions between the map classes, and the colors of the map. Single classes may be defined and extracted or emphasized. These techniques offer a powerful tool for understanding national trends, the major need of the White House

and Congress which are the major users. DIDS can also analyze more than one variable in several ways. The system can map two variables simultaneously, showing geographic relationships and can scatter plot the values of one variable against another. DIDS can also store several images, presently four, in local memory, and can display them in rapid sequence, giving the illusion of movement. Trends in variables can be revealed in this way.

These two systems are examples of developing environmental analysis techniques. Staff of General Software Corporation, the firm conducting this survey, created these two systems and are presently enhancing them. The UPGRADE capabilities are being reproduced on a minicomputer, additional capabilities such as geographic information systems are being studied for inclusion, and General Software Corporation is developing an operational library of environmental models for the Council of Environmental Quality and the Environmental Protection Agency.

These are some of the recent developments in environmental analysis which could be available through an integrated information network. We need to know your environmental mission requirements, the resources you now have to fulfill them, your opinion on the adequacy of present resources and your suggestions for improvements. Your answers will be the basis for our analysis and recommendations and our suggestions cannot fundamentally be better than the information you give us, so please spend some time and thought to help us to serve your needs.

Thank you!

1. CONTACT INFORMATION

TO BE COMPLETED BY

ALL RESPONDENTS

0.0 CONTACT INFORMATION

0.1 NAME ______________________________

0.2 TITLE ______________________________

0.3 GROUP NAME * ______________________________

____

0.4 ORGANIZATION ______________________________

____

0.5 POSTAL ADDRESS ______________________________

____

____

0.6 TELEPHONE NUMBER (____) ______________________________

(____) ______________________________

* PLEASE BE PRECISE AND BE SURE THAT THE QUESTIONNAIRE ANSWERS ALWAYS REFER TO THE GROUP NAMED HERE.

ENVIRONMENTAL ACTIVITIES QUESTIONNAIRE FOR THE UNITED STATES AIR FORCE

This questionnaire is designed to establish USAF capabilities and requirements for environmental analysis. This study includes all Air Force uses of environmental information from the collection, storage, and retrieval of data, through preliminary facility planning and environmental impact analysis and modeling to construction and site monitoring. Environmental models which simulate processes such as air movement or water runoff are of special interest because of the power of these techniques to aid many kinds of environmental analysis and planning.

Air Force use of environmental information has not been extensively surveyed and one of the purposes of this questionnaire is to provide an overview for general information. Another purpose of this questionnaire is to establish which environmental data and analysis techniques are required to satisfy mission needs and whether these requirements can be satisfied more efficiently.

The final purpose is to study how the many separate environmental centers of the Air Force work separately and together, and whether an information exchange network could be designed to improve efficiency, reduce duplication of effort, and enlarge Air Force capabilities. There are no preconceived ideas about the best structure for this network, or even whether networking is the best solution.

This questionnaire is designed to collect not only information on present requirements and capabilities, but also suggestions for improvement. Please answer the following questions as fully and accurately as possible; these will be the basis for assessing ideas for change. Also, if you have any ideas for improvement, please list them in Section 4.0 - COMMENTS AND SUGGESTIONS; all suggestions will be tested for cost and benefit and, if promising, included in the final recommendations of this study.

Air Force work with environmental information is of three general kinds:

- o Management and Administration
- o Computer Systems
- o Environmental Science and Planning.

Some respondents to this questionnaire will work exclusively in one or another of these areas. Others may work in two or possibly all three, but the questions can still be usefully separated. The following questionnaire master sheet is designed to establish which of the three areas you work in, and to direct you to the appropriate parts of the questionnaire; you will only need to complete the whole questionnaire if you work extensively in all three areas.

QUESTIONNAIRE MASTER SHEET

This page will indicate which parts of the questionnaire you should complete. Start with question 1, mark your answer, and follow the appropriate instructions. If this instruction involves answering a section of the questionnaire, complete that section, and the final instruction in the section will return you to the master sheet. Repeat this process for all questions on the master sheet, until the questionnaire sections appropriate to you are complete. If you fill out more than one section of the questionnaire (i.e., Administrative and Computer Systems), and if the mission requirements are the same for each section, simply indicate "the same". If different, indicate those mission requirements in each section.

PLEASE MARK YOUR ANSWERS IN THE SQUARES PROVIDED.

QUESTION NO.	QUESTION	RESPONSE	
		YES	NO
1	DO YOU MANAGE OR ADMINISTRATE U.S. AIR FORCE ENVIRONMENTAL ANALYSIS TASKS?	GO TO SECTION 1.0 MANAGEMENT & ADMINISTRATIVE (P. 1/1) AND COMPLETE	GO TO QUESTION 2 OF THIS MASTER SHEET
2	DO YOU PERFORM COMPUTER SYSTEMS WORK FOR USAF ENVIRONMENTAL ANALYSIS TASKS? (INCLUDES DIGITAL DATABASE MANAGEMENT, SYSTEMS DESIGN, APP. PROGRAMMING, ETC.)	GO TO SECTION 2.0 COMPUTER SYSTEMS (P.2/1) AND COMPLETE	GO TO QUESTION 3 OF THIS MASTER SHEET
3	DO YOU PERFORM ENVIRONMENTAL SCIENCE OR PLANNING WORK FOR USAF ENVIRONMENTAL ANALYSIS TASKS? (INCLUDES WORK IN GEOLOGY, EARTH SCIENCES, ETC., ENVIRONMENTAL ANALYSIS, MODELING, PLANNING AND DESIGN)	GO TO SECTION 3.0 ENVIRONMENTAL SCIENCES & PLANNING (P.3/1 AND COMPLETE)	GO TO SECTION 4.0 COMMENTS AND SUGGESTIONS

1.0 MANAGEMENT AND ADMINISTRATION

If you are answering this part of the questionnaire you have managerial responsibilities for environmental tasks. Answer the questions only for the group which you supervise. This section asks four basic questions about the management of environmental tasks:

1. What are you required to do?
2. What resources do you have to do it?
3. Are these adequate?
4. If not, what more is needed?

Part of your answers will provide information on current tasks and resources, and part will be a managerial assessment of desired improvements. Note that there is no implication that present mission requirements are not now satisfied as fully as possible with present resources. This questionnaire is part of a project which seeks to improve the environmental information service available to the Air Force, and to do this, it is important to have your perception of deficiencies and desired improvements.

1.1 WHAT IS THE NAME OF YOUR GROUP?

____

1.2 WHAT IS THE BASIC MISSION OF YOUR GROUP?

____

____

____

1.3 BRIEFLY DESCRIBE THE MISSION ELEMENTS OF YOUR GROUP WITH RESPECT TO ENVIRONMENTAL INFORMATION OR ANALYSIS.

____

____

____

____

1.4 WHICH AIR FORCE REGULATIONS APPLY TO YOUR MISSION?

____

____

1.5 WHICH GROUP IN THE AIR FORCE DETERMINES YOUR MISSION?

____

____

1.6. IS YOUR MISSION BROADLY STATED IN PRINCIPLE OR CLOSELY DEFINED BY REGULATIONS AND GUIDELINES?

/_/ BROADLY STATED MISSION

/_/ CLOSELY DEFINED MISSION

1.7 GIVE THE TOTAL NUMBER OF STAFF INCLUDED IN YOUR GROUP WHICH ARE INVOLVED IN ENVIRONMENTAL-RELATED ACTIVITIES IN TERMS OF FULL-TIME EQUIVALENTS. (A FULL-TIME EQUIVALENT REFERS TO EITHER A FULL-TIME STAFF MEMBER OR A COMBINATION OF PART-TIME STAFF MEMBERS WHICH APPROXIMATELY EQUALS THE WORK FORCE OF FULL-TIME MEMBER).

____

1.8 ON THE FOLLOWING PAGE IS A JOB SKILL INVENTORY TABLE. THIS TABLE SHOULD BE FILLED OUT CAREFULLY IN FULL DETAIL. THE TABLE DEFINES THE JOB SKILLS OF THE PERSONNEL ON YOUR STAFF. THE NAMES OF INDIVIDUAL STAFF SHOULD NOT BE USED, BUT THE JOB TITLE (E.G., BIO ENGINEER) OF EACH MEMBER OF THE GROUP WHICH YOU SUPERVISE SHOULD BE INCLUDED. THE EDUCATIONAL LEVEL, SUMMARY OF DUTIES AND APPLICATION SKILLS (I.E., HYDROLOGY, COMPUTER PROGRAMMING, ETC.) SHOULD BE COMPLETED FOR EACH MEMBER OF THE GROUP.

*NB, IF MORE THAN ONE SHEET IS NEEDED PLEASE COPY THIS BLANK SHEET BEFORE STARTING AND ADD THE COPIES TO THE QUESTIONNAIRE.

1.8(A) JOB SKILL INVENTORY							
JOB TITLE	EDUCATION					SUMMARY OF DUTIES	APPLICATION SKILLS & EXPERIENCE (E.G., HYDROLOGY, COMPUTER PROGRAMMING, ETC.)
	HIGH SCHOOL	BACHELORS	MASTERS	2 MASTERS	PH.D.		

1.3(B) ARE THE SKILL LEVELS OF YOUR STAFF TYPICAL FOR THOSE JOB POSITIONS (I.E., THE LEVELS REQUIRED BY THE JOB DESCRIPTION)?_______________

IF NOT, WHAT SKILLS ARE IN ADDITION TO WHAT IS NECESSARY?_______________

____

____

____

(C) WHAT HAS BEEN THE APPROXIMATE PERSONNEL TURN-OVER RATE OF JOBS IN YOUR GROUP?

IN THE PAST ONE YEAR ___________%

IN THE PAST 2 YEARS ___________%

IN THE PAST 5 YEARS ___________%

(D) DO YOU EXPECT THESE PERSONNEL RATES IN THE FUTURE

- TO BE HIGHER? /__/
- TO BE ABOUT THE SAME? /__/
- TO BE LOWER? /__/

1.9 IF YOUR GROUP USES COMPUTER HARDWARE (SUCH AS A MAINFRAME COMPUTER, A MINICOMPUTER, MICROCOMPUTERS, OR DESK-TOP UNITS), ANSWER THE FOLLOWING QUESTIONS:

(A) BRIEFLY DESCRIBE THE COMPUTER HARDWARE SYSTEMS USED BY YOUR GROUP TO PERFORM ENVIRONMENTAL ANALYSIS OR PLANNING (E.G., A MAINFRAME COMPUTER WITH 15 TERMINALS AND THREE DESK-TOP COMPUTERS)_______________

____

____

____

____

(B) IS THE COMPUTER HARDWARE AVAILABLE SUITABLE IN ACCOMPLISHING YOUR GROUP'S ENVIRONMENTAL TASKS, (IF NOT, PLEASE EXPLAIN)?____________________

____

____

____

(C) IN THE CASE THAT MORE COMPUTER HARDWARE IS NECESSARY TO COMPLETE YOUR GROUP'S ENVIRONMENTAL TASKS, BRIEFLY DESCRIBE THE STANDARD PROCEDURE FOR PROCURING NEW HARDWARE? (E.G., WRITTEN PROPOSAL WOULD BE SENT TO....ETC.)____________________

____

____

1.10 DO YOU PRESENTLY USE ANY OF THE FOLLOWING CAPABILITIES OUTSIDE YOUR OWN GROUP? (IF YES, CHECK)

/_/ DATA /_/ SOFTWARE /_/ PERSONNEL

/_/ HARDWARE (I.E.,TERMINAL ACCESS TO REMOTE COMPUTER)

1.11 IF YOU DO USE OUTSIDE CAPABILITIES, WHERE DO YOU GO GO FOR THEM (CHECK)?

/_/ OTHER USAFB'S

/_/ USAF LABS OR OTHER GENERAL AF FACILITIES

/_/ OTHER ARMED SERVICE FACILITIES

/ / OTHER FEDERAL GOVERNMENT FACILITIES

/ / PRIVATE CONTRACTORS

/ / COMMERCIAL TIME SHARING COMPUTER SYSTSMS

/ / UNIVERSITIES

/ / OTHER (SPECIFY)

1.12 IF YOU HAVE USED CAPABILITIES FROM OTHER LOCATIONS, WHICH WERE THE MOST SUCCESSFUL GROUPS AND CAPABILITIES? ______________________________

____

____

WHICH WERE THE LEAST SUCCESSFUL GROUPS AND CAPABILITIES AND WHAT WERE THE PROBLEMS? ______________

____

____

____

1.13 HOW DO YOU LEARN ABOUT NEW DATA OR ANALYSIS OR PLANNING TECHNIQUES WHICH COULD HELP IN YOUR ENVIRONMENTAL-RELATED TASKS? (CHECK)

- /__/ TECHNICAL JOURNAL
- /__/ CONFERENCE
- /__/ USAF NEWSLETTER (SPECIFY) ______________
- /__/ USAF SEMINAR/WORKSHOP (SPECIFY) __________ ______________________________
- /__/ WORD OF MOUTH
- /__/ OTHER (SPECIFY) ______________________

1.14 DO YOU HAVE AS MUCH ACCESS TO OUTSIDE DATA AND ANALYSIS TECHNIQUES AS YOU WOULD LIKE?

- /__/ FULLY ENOUGH
- /__/ NEARLY ENOUGH
- /__/ NOT ENOUGH
- /__/ NONE AT ALL

1.15 IF THERE WAS AN INFORMATION NETWORK WHOSE TASK WAS THE COLLECTION AND DISTRIBUTION OF ENVIRONMENTAL DATA, ANALYSIS TECHNIQUES AND CAPABILITIES FOR AIR FORCE MISSIONS, HOW USEFUL WOULD THIS BE TO YOU?

/_/ ESSENTIAL

/_/ VERY USEFUL

/_/ USEFUL

/_/ NOT USEFUL

1.16 WHAT PREVENTS YOU FROM MAKING MORE USE OF DATA OR ANALYSIS TECHNIQUES LOCATED OUTSIDE YOUR GROUP? (CHECK ALL APPROPRIATE ITEMS)

/_/ IN-HOUSE CAPABILITIES ADEQUATE FOR MISSION

/_/ LACK OF KNOWLEDGE OF WHAT IS AVAILABLE

/_/ LACK OF TIME TO FIND OUT WHAT IS AVAILABLE

/_/ LACK OF MEANS TO FIND OUT WHAT IS AVAILABLE

/_/ LACK OF IN-HOUSE SKILLS TO HANDLE NEW TECHNIQUES

/_/ LACK OF TIME TO LEARN NEW TECHNIQUES

/_/ PREFERENCE FOR IN-HOUSE TECHNIQUES

/_/ UNWILLINGNESS OF OTHER AGENCIES TO PROVIDE CAPABILITIES

/_/ LACK OF DOCUMENTATION

/_/ OTHER (SPECIFY)________________________

____

/_/ OTHER (SPECIFY)________________________

____

1.17 PLEASE FILL OUT THE FOLLOWING CHECKLIST OF CURRENT ACTIVITIES IN YOUR GROUP. IF AN ACTIVITY IS NOT DONE, CHECK NEVER AND CONTINUE TO THE NEXT ACTIVITY. IF THE AVAILABLE RESOURCES ARE PARTIALLY INADEQUATE OR INADEQUATE, CHECK POSSIBLE IMPROVEMENT AREAS.

	ACTIVITY	HOW OFTEN DOES YOUR MISSION REQUIRE THIS ACTIVITY?				ARE YOUR RESOURCES ADEQUATE TO MEET MISSION REQUIREMENTS?			IMPROVEMENTS (NEEDED)								
		MAJOR ACTIVITY	FREQUENTLY	OCCASSIONALLY	NEVER	FULLY ADEQUATE	PARTIALLY INADEQUATE	INADEQUATE	HIGHER SKILLS LEVEL	MORE PERSONNEL	MORE HARDWARE CAPACITY	GREATER LIAISON	OTHER (SPECIFY)	OTHER (SPECIFY)			
DATA	ENVIRONMENTAL DATA SURVEY																
	ENVIRONMENTAL MONITORING																
	MAPPING																
	ENVIRONMENTAL DATA COLLECTION FROM OTHER AGENCIES																
	QUALITY CONTROL/VERIFICATION																
	REFORMATTING AND INTEGRATION																
	UPDATE AND MAINTENANCE																
	DISTRIBUTION TO OTHER USERS																
	OTHER DATA ACTIVITIES (SPECIFY) ______																
	OTHER (SPECIFY)																

1.17 (Continued)

	Activity	How often does your mission require this activity? Major activity	Frequently	Occassionally	Never	Are your resources adequate to meet mission requirements? Fully adequate	Partially inadequate	Inadequate	Improvements (Needed) Higher skills levels	More personnel	More hardware cap.	More data access	Greater liaison	Other	Other		
Environmental Analysis and Design	Simulation modeling																
	Cause and effect analysis (e.g., regression path)																
	Trend analysis-change detection																
	Photo interpretation																
	Digital remote survey image analysis																
	Environmental impact statement preparation																
	Facility location analysis																
	Site planning and design																
	Technical testimony																
	Other (Specify) ____																
	Other (Specify)																

1.17 (CONTINUED)

	ACTIVITY	HOW OFTEN DOES YOUR MISSION REQUIRE THIS ACTIVITY?				ARE YOUR RESOURCES ADEQUATE TO MEET MISSION REQUIREMENTS?			IMPROVEMENTS (NEEDED)								
		MAJOR ACTIVITY	FREQUENTLY	OCCASSIONALLY	NEVER	FULLY ADEQUATE	PARTIALLY ADEQUATE	INADEQUATE	HIGHER SKILLS LEVELS	MORE PERSONNEL	MORE HARDWARE CAP.	MORE DATA ACCESS	GREATER LIAISON	OTHER	OTHER		
COMPUTER SYSTEMS	HARDWARE SELECTION																
	HARDWARE MAINTENANCE																
	COMPUTER PROGRAM DEVELOPMENT																
	COMPUTER PROGRAM CONVERSION																
	COMPUTER PROGRAM DOCUMENTATION																
	COMPUTER PROGRAM VALIDATION																
	COMPUTER PROGRAM MAINTENANCE																
	COMPUTER PROGRAM DISTRIBUTION & COORDINATION																
	OTHER (SPECIFY)																
	OTHER (SPECIFY)																

THIS IS THE END OF THE MANAGEMENT AND ADMINISTRATION SECTION. IF YOU HAVE JUST COMPLETED SECTION 1, GO TO THE MASTER SHEET, PAGE 0/4 OF INTRODUCTION, QUESTION NUMBER 2.

IF YOU HAVE ALSO COMPLETED SECTION 2, COMPUTER SYSTEMS, GO TO MASTER SHEET, PAGE 0/4 OF INTRODUCTION, QUESTION NUMBER 3.

IF YOU HAVE ALSO COMPLETED SECTION 3, ENVIRONMENTAL SCIENCE AND PLANNING, GO TO SECTION 4, COMMENTS AND SUGGESTIONS, PAGE 4/1.

2.0 COMPUTER SYSTEMS

If you are answering this part of the questionnaire you have computer systems responsibilities, such as computer operations or program development and maintenance.

This section is divided into three sections: Hardware, Programming, and Program Usage Information. Answer only those questions applicable to your group. If you have already answered the mission-related question in Section 1, Management and Administration only answer questions 2.1 to 2.6., if the mission is different; otherwise answer "the same as Section 1".

2.1 WHAT IS THE NAME OF YOUR GROUP?

____

2.2 WHAT IS THE BASIC MISSION(S) OF YOUR GROUP?

____

____

____

2.3 BRIEFLY DESCRIBE THE MISSION ELEMENTS OF YOUR GROUP WITH RESPECT TO THE USE OF COMPUTER SYSTEMS FOR ENVIRONMENTAL-RELATED ACTIVITIES.

____

____

____

____

2.4 WHICH AIR FORCE REGULATIONS APPLY TO YOUR MISSION?

____

____

____

2.5 WHICH GROUP IN THE AIR FORCE DETERMINES YOUR MISSION? ____

____

____

2.6 IS YOUR MISSION BROADLY STATED IN PRINCIPLE OR CLOSELY DEFINED BY REGULATIONS AND GUIDELINES?

/__/ BROADLY STATED MISSION

/__/ CLOSELY DEFINED MISSION

2.7 Describe the hardware available for environmental activities below: Give descrip. of each system used on a regular basis:			
	Description	Existing ** System	Adequate or not? (If no, pls. comment)
	Type of system (Main-frame, mini, etc)		
	Vendor and Model (e.g. IBM 370/148, B6700, etc.)		
	Core or memory size (e.g. 32k bytes or 128k words) Word size		
	Operating system (e.g. OS/VS1, RSX-11M, etc)		
	Number of alphanumeric or graphic terminals used for environmental activities		
	If you use dial-up facilities, give line specs (300 baud, etc)		
	If you use dial-up facilities, do you have a local high-speed printer? (Specify)		
	Do you use a plotter? (Specify type)		
	Languages supported		

**Include mainframes, midi, mini, micro-computers, and desk units. Use additional sheets if necessary

2.11 PROGRAMMING LANGUAGES

o INDICATE THE LANGUAGES WHICH ARE USED ON A REGULAR BASIS FOR ENVIRONMENTAL-RELATED ACTIVITIES:

/_/ PASCAL	/_/ RPG
/_/ FORTRAN IV	/_/ C
/_/ FORTRAN V	/_/ ADA
/_/ OTHER FORTRAN	/_/ COBOL
/_/ BASIC	/_/ ALGOL
/_/ PL/1	/_/ ASSEMBLY
/_/ OTHER (DESCRIBE)	/_/ APL

____

/_/ OTHER (DESCRIBE)

____

/_/ OTHER (DESCRIBE)

2.12 SOFTWARE DEVELOPMENT

IF YOU DEVELOP, ADAPT, MAINTAIN, OR CONVERT ENVIRONMENTAL-ORIENTED PROGRAMS FOR ANALYTICAL USE, PLEASE ANSWER THE FOLLOWING:

1. HOW MANY FULL-TIME EQUIVALENT STAFF MEMBERS ARE INVOLVED? (A FULL-TIME EQUIVALENT IS EITHER A FULL-TIME STAFF MEMBER, OR A GROUP OF PART-TIME STAFF MEMBERS WHOSE WORK TIME APPROXIMATELY EQUALS A FULL-TIME STAFF MEMBER). ____________

2. WHAT LANGUAGE(S) IS USED FOR THE DEVELOPMENT OF ENVIRONMENTAL-ORIENTED SOFTWARE FOR YOUR GROUP? ______________________________

____

____

3. INDICATE THE AREAS OF ENVIRONMENTAL ACTIVITY IN WHICH SOFTWARE DEVELOPMENT IS TAKING PLACE: (E.G., HYDROLOGY, CHEMICAL SPILLS, ETC.)

____

____

____

____

4. DO YOU MAKE THE APPLICATION PROGRAMS AND OTHER SOFTWARE AVAILABLE FOR USE OUTSIDE OF YOUR GROUP? /_/ YES /_/ NO

5. IF "YES" TO 4. ABOVE:
   (I) DO YOU PROVIDE MAINTENANCE AND UP-GRADES ON A REGULAR BASIS?
   /_/ YES /_/ NO
   (II) IS DETAILED DOCUMENTATION AVAILABLE?
   /_/ YES /_/ NO
   (III) WHAT GROUPS DO YOU MAKE THIS SOFTWARE AVAILABLE TO AND HOW? (E.G., INFORMATION NETWORK)

   ____

   ____

   ____

6. IF "NO" TO 4. ABOVE:
   (I) WOULD YOU LIKE TO MAKE SOFTWARE AVAILABLE OUTSIDE YOUR GROUP? /_/ YES /_/ NO

7. WHY DO YOU PERFORM SOFTWARE DEVELOPMENT?
   /_/ CAPABILITIES NOT AVAILABLE ELSEWHERE
   /_/ EASIER AND LESS EXPENSIVE THAN OBTAINING ELSEWHERE
   /_/ CAPABILITIES NOT AVAILABLE ON HARDWARE

2.12 7. (CONTINUED)

/__/ INADEQUATE DOCUMENTATION OF SOFTWARE FROM OUTSIDE SOURCES

/__/ OTHER (DESCRIBE)____________________

____

____

2.13 INDICATE BY RANK WHAT YOU CONSIDER TO THE MOST IMPORTANT ELEMENTS WHICH PROVIDE FOR EFFECTIVE UTILIZATION OF YOUR COMPUTER (OR OTHER COMPUTATION SYSTEMS) FOR ENVIRONMENTAL APPLICATIONS WITHIN YOU ORGANIZATION.

RANK IS AS FOLLOWS.

0 - NO IMPORTANCE
1 - SLIGHT IMPORTANCE
2 - SIGNIFICANT IMPORTANCE
3 - MAJOR IMPORTANCE.

/__/ ADEQUATE RESPONSE OR TURN-AROUND TIME

/__/ ADEQUATE AND EASILY UNDERSTOOD OPERATING SYSTEM

/__/ LOW COST ON COMPUTER RUNS

/__/ AVAILABILITY OF INTERACTIVE TERMINALS

/__/ ADEQUATE MEMORY AND DISK CAPACITY

/__/ AVAILABILITY OF EXPERIENCED LIASON BETWEEN USER AND COMPUTER STAFF

/__/ AVAILABILITY OF ADEQUATE ENVIRONMENTAL-ORIENTED COMPUTER PROGRAMS

/__/ AVAILABILITY OF ADEQUATE PROGRAM DOCUMENTATION

/__/ AVAILABILITY OF CONTINUING EDUCATION RELATING TO THE USE OF THE COMPUTER OR COMPUTER PROGRAMS

/__/ ABILITY TO PERFORM SMALL COMPUTATIONAL PROBLEMS

/__/ ABILITY TO PERFORM LARGE COMPUTATIONAL PROBLEMS

2.13 (CONTINUED)

/__/ ABILITY TO PERFORM DATABASE AND DATA MANIPULATIONS

/__/ ABILITY TO PERFORM GRAPHIC APPLICATIONS

/__/ ABILITY TO PERFORM TEXT EDITING

/__/ ABILITY TO PERFORM PROGRAM DEVELOPMENT

/__/ ABILITY TO PERFORM SENSOR BASED APPLICATIONS

/__/ ABILITY TO NETWORK (COMMUNICATIONS NETWORK WITH OTHER COMPUTERS)

/__/ OTHER(SPECIFY)______________________________

/__/ OTHER(SPECIFY)______________________________

2.14 FUNCTION INFORMATION - PLEASE INDICATE THOSE FUNCTIONAL ACTIVITIES CURRENTLY BEING PERFORMED BY YOUR GROUP (WITH RESPECT TO ENVIRONMENTAL-RELATED TASKS).

	ACTIVITY	NOT BEING PERFORMED	SOMETIMES PERFORMED	REGULARLY PERFORMED	CURRENT CAPABILITIES (PLEASE BRIEFLY COMMENT)
	PERFORMS A FULL RANGE OF COMPUTER OPERATIONS FUNCTIONS, INCLUDING PROCESSING VIA BATCH AND USER TERMINALS;				
	PROVIDES INFORMATION ON SOFTWARE, INCLUDING THE STATUS AND AVAILABILITY OF APPLICATION PROGRAMS TO SYSTEM USERS;				
	PROVIDES A FULL RANGE OF INFORMATION ON OUTSIDE SOURCES OF PROGRAMS, INCLUDING USER GROUPS, SERVICE BUREAUS, AND UNIVERSITIES;				
	PROVIDES TRAINING ON THE UTILIZATION OF THE COMPUTER SYSTEM AND METHODOLOGY OF APPLICATION SOFTWARE;				
	THE COMPUTER-ORIENTED NEEDS OF THE USERS, INCLUDING SOFTWARE, HARDWARE, AND SUPPORT REQUIREMENTS;				
	ESTABLISHES LIAISON WITH VARIOUS USER GROUPS AND PROFESSIONAL ORGANIZATIONS, WHICH ARE A SOURCE OF DATA AND SOFTWARE;				
	CATALOGS AND RATES APPLICATION SOFTWARE FOR THE USERS;				

2.14 FUNCTIONAL INFORMATION - (CONTINUED)

	ACTIVITY	NOT BEING PERFORMED	SOMETIMES PERFORMED	REGULARLY PERFORMED	CURRENT CAPABILITIES (PLEASE BRIEFLY COMMENT)
	PROCURES APPLICATION SOFTWARE FOR GENERAL USE ON THE SYSTEM;				
	PROVIDES THE STANDARDS FOR THE DEVELOPMENT OF APPLICATION SOFTWARE, INCLUDING LANGUAGE, DOCUMENTATION, AND INPUT/OUTPUT;				
	DEVELOPS APPLICATION SOFTWARE FOR SYSTEM USERS;				
	PROVIDES THE TESTING AND EVALUATION OF APPLICATION SOFTWARE;				
	PROVIDES MAINTENANCE FOR APPLICATIONS SOFTWARE;				
	REVIEWS COMPUTER APPLICATIONS METHODOLOGY AND RECOMMENDS AREAS WHICH ARE MOST CONSTRAINED AND IN NEED OF IMPROVEMENT.				

2.15 PLEASE INDICATE WHICH FUNCTIONS YOUR GROUP PROVIDES IN RELATION TO THE FOLLOWING ACTIVITIES BY CHECKING THE APPROPRIATE BOX (E.G., DEVELOP) AND COMMENT IF ELABORATION IS NECESSARY

	ACTIVITY	DEVELOP	MAINTAIN	DISTRIBUTE	USE	COMMENTS (IF NECESSARY)
	MACHINE-READABLE DATABASE					
	ENVIRONMENTAL MODELING SOFTWARE					
	IMAGE ANALYSIS SOFTWARE					
	GEOGRAPHIC INFORMATION SYSTEM					
	STATISTICAL ANALYSIS					
	OTHER(SPECIFY)					
	OTHER(SPECIFY)					
	OTHER(SPECIFY)					

THIS IS THE END OF THE COMPUTER SYSTEMS SECTION. THERE ARE ALSO SOME QUESTIONS IN SECTION 1, MANAGEMENT AND ADMINISTRATION, WHICH ARE RELEVANT. PLEASE GO TO PAGE 1/6 AND COMPLETE QUESTIONS 1.10 TO 1.16 AND TABLE 1.17, UNLESS YOU HAVE ALREADY DONE SO. IF YOU HAVE, PLEASE GO TO MASTER SHEET, PAGE 0/4 OF INTRODUCTION, QUESTION NUMBER 3.

3.0 ENVIRONMENTAL SCIENCES AND PLANNING

If you are answering this part of the questionnaire you are involved in some aspect of environmental analysis, environmental program usage, or environmental planning. This section asks questions on analysis techniques, which features are needed, questions on computer program usage in different environmental subject areas, questions on databases used, and questions on the general analysis procedure. Please note that in this section the word "environment" includes both the natural and the cultural environment. Socio-economic studies should therefore be included.

The following questions will provide a flow through this section. Begin at question 3.1 and continue until all questions are answered, (not necessarily each section will be completed). Please answer only those question which apply to you; write "N/A" to questions not applicable. If you have already answered the mission related questions in Section 1, MANAGEMENT AND ADMINISTRATION or Section 2, COMPUTER SYSTEMS, only answer questions 3.1 to 3.6 if the mission is different. Otherwise, answer "the same as Section 1 or 2" (whichever is relevant).

3.1 WHAT IS THE NAME OF YOUR GROUP?

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3.2 WHAT IS THE BASIC MISSION OF YOUR GROUP?

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3.3 BRIEFLY DESCRIBE THE MISSION ELEMENTS OF YOUR GROUP WITH RESPECT TO ENVIRONMENTAL INFORMATION OR ANALYSIS? ______________________

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3.4 WHICH AIR FORCE REGULATIONS APPLY TO YOUR MISSION?

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3.5 WHICH GROUP IN THE AIR FORCE DETERMINES YOUR MISSION? ______________________

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____

3.6 IS YOUR MISSION BROADLY STATED IN PRINCIPLE OR CLOSELY DEFINED BY REGULATIONS AND GUIDELINES?

/_/ BROADLY STATED MISSION

/_/ CLOSELY DEFINED MISSION.

3.7 ENVIRONMENTAL ANALYSIS AND DESIGN

1. BRIEFLY EXPLAIN THE BASIC ENVIRONMENTAL SCIENCE * FUNCTIONS BEING PERFORMED BY YOUR GROUP ______________________

____

____

____

*(INCLUDES CULTURAL AND SOCIO-ECONOMIC SCIENCE)

3.7 ENVIRONMENTAL ANALYSIS AND DESIGN (CONTINUED FROM PREVIOUS PAGE)

2. BRIEFLY EXPLAIN THE BASIC ENVIRONMENTAL SCIENCE * FUNCTIONS YOU PERFORM__________

____

____

(* INCLUDES EARTH SCIENCES AND SOCIO-ECONOMIC SCIENCES)

3.8 IF YOUR GROUP PERFORMS ANY OF THE FOLLOWING ENVIRONMENTAL SCIENCE AND PLANNING ACTIVITIES, PLEASE CHECK THE APPROPRIATE BOX.

	A LOT	SOME	LITTLE	NONE
PRELIMINARY ENGINEERING DATA	☐	☐	☐	☐
FIELD SURVEY	☐	☐	☐	☐
MANUAL DATA INTERPRETATION	☐	☐	☐	☐
AUTOMATED DATA INTERPRETATION	☐	☐	☐	☐
COLLECTION OF MONITORING DATA	☐	☐	☐	☐
CHANGE DETECTION AND TREND ANALYSIS	☐	☐	☐	☐
NEED ANALYSIS FOR NEW AIR FORCE FACILITIES	☐	☐	☐	☐
LOCATION ANALYSIS FOR NEW AIR FORCE FACIL.	☐	☐	☐	☐
AIRPORT OPERATION DATA COLLECTION	☐	☐	☐	☐
ECONOMIC AND FORECAST DATA COLLECTION	☐	☐	☐	☐
U.S.G.S. TOPOGRAPHIC MAP USAGE	☐	☐	☐	☐
AERIAL PHOTOGRAPHY	☐	☐	☐	☐
HIGHWAY MAPPING	☐	☐	☐	☐
LAND USE PLANNING	☐	☐	☐	☐
ZONING MAP USAGE OR FORMATION	☐	☐	☐	☐
CENSUS DATA USAGE OR COLLECTION	☐	☐	☐	☐
SPECIAL ORDINANCE INTERPRETATION	☐	☐	☐	☐
PARKS, OPEN SPACE MAPPING OR MAP USAGE	☐	☐	☐	☐
USE OF HISTORIC OR ARCHAEOLOGICAL RESOURCE DATA	☐	☐	☐	☐
PUBLIC FACILITIES DATA COLLECTION OR USE	☐	☐	☐	☐
PROPERTY TAX ASSESSMENTS	☐	☐	☐	☐
SOILS MAP USAGE OR FORMULATION	☐	☐	☐	☐

3.8 (CONTINUED FROM PREVIOUS PAGE)

	A LOT	SOME	LITTLE	NONE
GEOLOGY AND WATER TABLE	/ /	/ /	/ /	/ /
DRAINAGE MAP USAGE OR FORMULATION	/ /	/ /	/ /	/ /
WILDLIFE RANGE MAP USAGE	/ /	/ /	/ /	/ /
RARE/ENDANGERED SPECIES LIST USAGE	/ /	/ /	/ /	/ /
FLOODPLAIN MAP USAGE	/ /	/ /	/ /	/ /
COASTAL ZONE/WETLAND MAPPING AND DATA COLLECTION	/ /	/ /	/ /	/ /
WATER QUALITY CLASSIFICATION LISTING	/ /	/ /	/ /	/ /
METEOROLOGICAL DATA COLLECTION OR USAGE	/ /	/ /	/ /	/ /
AIR QUALITY DATA COLLECTION OR USAGE	/ /	/ /	/ /	/ /
ENERGY CONSUMPTION RATE ANALYSIS	/ /	/ /	/ /	/ /
PRELIMINARY SITE DESIGN	/ /	/ /	/ /	/ /
DETAIL SITE DESIGN	/ /	/ /	/ /	/ /
PREPARATION OF ENVIRONMENTAL IMPACT STATEMENTS	/ /	/ /	/ /	/ /
PREPARATION OF OTHER REGULATORY REPORTS (SPECIFY)	/ /	/ /	/ /	/ /
TECHNICAL TESTIMONY AT ADMINISTRATIVE OR LEGAL HEARINGS	/ /	/ /	/ /	/ /
SUPERVISION OF CONSTRUCTION	/ /	/ /	/ /	/ /
POST-CONSTRUCTION MONITORING	/ /	/ /	/ /	/ /
OTHER *________	/ /	/ /	/ /	/ /
OTHER *________	/ /	/ /	/ /	/ /
OTHER *________	/ /	/ /	/ /	/ /
OTHER *________	/ /	/ /	/ /	/ /

(* PLEASE SPECIFY)

3.9 ENVIRONMENTAL DATA

1. WHERE DO YOU GET YOUR DATA FOR YOUR ENVIRONMENTAL STUDIES? (E.G., FIELD DATA, DATABASE, OTHER SOURCES, ETC.) _

3.9 ENVIRONMENTAL DATA (CONTINUED FROM PREVIOUS PAGE)

2. LIST ANY DATABASES YOU USE AND THE ORGANIZATION WHICH MAINTAINS IT (USAF, STORET, ETC.):

____________________ ____________________

____________________ ____________________

____________________ ____________________

3. DO YOU KNOW OF DATA AVAILABLE FROM SOURCES NOT LISTED ABOVE?____________________

   WOULD YOU LIKE TO USE IT?________________

   IF "YES", PLEASE LIST____________________

   ____

   ____

4. DO YOU SHARE YOUR ENVIRONMENTAL DATA WITH OTHER USAF ORGANIZATIONS?________________

   IF "YES", WHICH ORGANIZATIONS AND WHAT DATA?

   ____

   ____

   ____

5. DO YOU COLLECT YOUR OWN ENVIRONMENTAL DATA?

   ____

   IF "YES", DO YOU STORE THIS DATA IN ANY STANDARD SYSTEM (E.G., DATABASE)?________

   (PLEASE NAME AND DESCRIBE)________________

   ____

   ____

6. HAVE YOU HAD ANY PROBLEMS WITH DATA STANDARDIZATION OR COORDINATION?______________

   IF "YES", PLEASE DESCRIBE________________

   ________________ ____________________

7. WOULD AN ENVIRONMENTAL INFORMATION NETWORK WHICH ROUTINELY CATALOGUES, STANDARDIZES, AND DISTRIBUTES DATA TO YOU BE HELPFUL? (PLEASE COMMENT)________________

____

____

____

3.10 ANALYTICAL TOOLS AND PROCESSES

1. PLEASE INDICATE HOW EXTENSIVE EACH OF THE FOLLOWING ANALYTICAL TOOLS IS USED BY YOUR GROUP IN ENVIRONMENTAL SCIENCE.

	A LOT	SOME	A LITTLE	NONE
MANUALS, CHARTS, NOMOGRAMS	/_/	/_/	/_/	/_/
DESK-TOP COMPUTER UNITS (INCLUDES CALCULATORS)	/_/	/_/	/_/	/_/
MINICOMPUTERS	/_/	/_/	/_/	/_/
MAIN-FRAME COMPUTER	/_/	/_/	/_/	/_/

2. WHICH OF THE FOLLOWING PERFORMS THE MAJORITY OF YOUR ENVIRONMENTAL ANALYSIS?

/_/ IN-HOUSE /_/ CONSULTANTS

/_/ OTHER USAF GROUP /_/ OTHER(SPECIFY)______

____

3. USING TABLE 3.1 - REQUIREMENTS FOR ENVIRONMENTAL SCIENCES, RATE THE DESIRABILITY OR NECESSITY OF SPECIFIC FEATURES IN THE ANALYSIS PROCEDURE. (THIS IS TO BE FILLED OUT ONLY BY THOSE DIRECTLY INVOLVED IN ANALYSIS AND PLANNING). PLEASE CHECK THE APPROPRIATE COLUMN(S) WHICH MATCH YOUR ANALYSIS REQUIREMENTS.

TABLE 3.1 - REQUIREMENTS FOR ENVIRONMENTAL SCIENCES					
	FEATURE	(CHECK ONE)			
		MANDATORY	DESIRED	NOT REQUIRED	UNKNOWN
SURFACE WATER HYDROLOGY	CAPABILITY TO ANALYZE SMALL WATERSHED AREAS				
	CAPABILITY TO ANALYZE LARGE WATERSHED AREAS				
	CAPABILITY TO ANALYZE RURAL LAND AREAS				
	CAPABILITY TO ANALYZE URBAN LAND AREAS				
	CAPABILITY TO GENERATE ENTIRE HYDROGRAPH(S)				
	CAPABILITY TO PERFORM FLOOD ROUTING				
	CAPABILITY TO PERFORM SNOWMELT CONSIDERATIONS				
	CAPABILITY TO PERFORM A CONTINUOUS SIMULATION OF A STORM EVENT				
	CAPABILITY TO PERFORM A CONTINUOUS SIMULATION IN REAL-TIME				
	CAPABILITY TO COMPUTE EFFECTS OF SEDIMENTATION AND SCOUR				
	CAPABILITY TO RECORD WATER FLOW FROM A SIMULATION				
	AUTOMATIC TIME INTERVAL GENERATION				
	CAPABILITY TO COMPUTE INFILTRATION RATES				
	OTHER (SPECIFY)				
	OTHER (SPECIFY)				
	OTHER (SPECIFY)				

TABLE 3.1 - REQUIREMENTS FOR ENVIRONMENTAL SCIENCES

	FEATURE	(CHECK ONE) MANDATORY	DESIRED	NOT REQUIRED	UNKNOWN
AIR QUALITY	REACTIVE POLLUTANT CAPABILITY				
	NON-REACTIVE POLLUTANT CAPABILITY				
	PHYSICAL LOSS OUT OF ELEMENT COMPUTATIONS (E.G., SCAVENGING, RAIN-OUT, SURFAC DE-COMPOSITION)				
	VARIABLE (SPACE AND TIME) WIND SPEEDS				
	VARIABLE (SPACE AND TIME) WIND DIRECTION				
	VARIABLE (SPACE AND TIME) INVERSION BASE HEIGHT				
	VARIABLE (SPACE AND TIME) REACTIVE POLLUTANTS				
	VARIABLE (SPACE AND TIME) INCIDENT SUNLIGHT				
	POINT SOURCES				
	LINEAR SOURCES				
	AREA SOURCES				
	COMPLEX TOPOGRAPHY				
	SIMPLE TOPOGRAPHY				
	VERTICAL DISPERSION OF POLLUTANTS				
	CROSS-WIND DISPERSION OF POLLUTANTS				
	MULTI-ELEMENT INTERACTIVE MODELING				
	SINGLE ELEMENT MODELING				
	MULTIPLE POLLUTANT INTRODUCTIONS (SIMULTANEOUS)				
	REGIONAL & SUB-CONTINENTAL ELEMENTS				
	LOCALIZED, PROJECT ELEMENTS				
	TIME SCALE: HOURS				
	TIME SCALE: DAYS				
	TIME SCALE: YEARS				
	OTHER (SPECIFY)				
	OTHER (SPECIFY)				
	OTHER (SPECIFY)				

TABLE 3.1 - REQUIREMENTS FOR ENVIRONMENTAL SCIENCES

	FEATURE	MANDATORY	DESIRED	NOT REQUIRED	UNKNOWN
		(CHECK ONE)			
WATER QUALITY	CAPABILITY TO MONITOR CARBONACEAOUS AND NITROGENOUS OXYGEN				
	WATER TEMPERATURE				
	DO LEVEL				
	BENTHAL OXYGEN				
	PHOSPHOROUS				
	COLIFORMS				
	CHLOROPHYLL-A				
	RADIO-ACTIVE CONSTITUENTS				
	SALINITY				
	CONSERVATIVE MINERALS				
	TIME DEPENDENT INPUT CONDITIONS				
	CAPABILITY TO MODEL CHANGES IN CHANNEL FLOW				
	CAPABILITY TO COMPUTE EFFECTS OF AERATION				
	CAPABILITY TO COMPUTE EFFECTS OF RESPIRATION				
	CAPABILITY TO COMPUTE EFFECTS OF PHOTOSYNTHESIS				
	CAPABILITY TO INCLUDE EFFECTS OF WASTE TREATMENT PLANT INPUT				
	CAPABILITY TO COMPUTE EVAPORATION AND PRECIPITATION EFFECTS				
	TIME-VARIANT POLLUTION SOURCES				
	POINT SOURCE				
	NON-POINT SOURCE				
	STEADY-STATE CONDITIONS				
	UNSTEADY CONDITIONS				
	STREAM AND RIVER MODELS				
	RESERVOIR AND LAKE MODELS				
	ESTUARINE MODELS				
	OCEAN INLET CAPABILITIES				
	DAM COMPUTATION CAPABILITIES				
	CAPABILITY TO COMP. EFFECTS OF MIXING ZONES				

(ATTACH SHEET FOR "OTHER")

TABLE 3.1 - REQUIREMENTS FOR ENVIRONMENTAL SCIENCES

	FEATURE	Mandatory	Desired	Not Required	Unknown
NOISE	Aircraft noise simulation				
	Highway noise simulation				
	Construction noise simulation				
	Urban noise simulation				
	Aircraft types:- Transport fighters				
	- Propeller-driven				
	- Specific aircraft(describe)				
	Aircraft Descritors:				
	- Detailed performance characters of individual aircrafts				
	- Variation in power management schedules during a flight operation				
	- Dispersion in flight paths				
	-Variation in atmospheric conditions				
	Noise Model Deceptors:				
	- Point				
	- Area				
	- National exposure				
	Capability to Analyze Various Noise Barriers: - Loudness Level				
	- A-Weighted sound levels				
	- Other(specify)				
	Plotted contours as output				

(Check One)

TABLE 3.1 - REQUIREMENTS FOR ENVIRONMENTAL SCIENCES

	FEATURE	Mandatory	Desired	Not Required	Unknown
CHEMICAL SPILLS	CAPABILITY TO ANALYZE LAND SPILLS				
	CAPABILITY TO ANALYZE WATER SPILLS				
	CAPABILITY TO ANALYZE FLAMMABLE MATERIAL SPILLS				
	CAPABILITY TO ANALYZE OIL SPILLS				
	CAPABILITY TO ANALYZE TOXIC CHEMICAL SPILLS				
GROUND WATER	ANALYTIC SOLUTION(EXACT)				
	NUMERIC SOLUTION(FINITE ELEMENT)				
	STEADY-STATE CONDITIONS				
	NON-STEADY-STATE CONDITIONS				
	SINGLE LAYER MODULES (ONE AQUIFER)				
	MULTI-LAYER MODULES WITH LEAKAGE BETWEEN LAYERS				
	CAPABILITY TO ANALYZE SEMI-PERMEABLE AND NON-PERMEABLE AQUIFERS				
	CAPABILITY TO SIMULATE STREAM AQUIFER INTERACTION				
	CAPABILITY TO SIMULATE SATURATED ELEMENT				
	CAPABILITY TO SIMULATE UNSATURATED ELEMENT				
	CAPABILITY TO INPUT HEAD DIFFERENTIALS ACROSS ELEMENT				
	CAPABILITY TO INPUT VARIABLE FLOW RATES ACROSS BOUNDARY.				

(Check One) applies to the columns Mandatory, Desired, Not Required, Unknown.

4. IF YOU USE COMPUTER SOFTWARE:

INDICATE THOSE SOURCES FROM WHICH YOUR FACILITY OBTAINS SOFTWARE FOR ENVIRONMENTAL ANALYSIS: (IF KNOWN)

- USAF SOURCES
  - /__/ INTERNAL DEVELOPMENT /__/ OTHER USAF FACILITIES
  - /__/ OTHER (SPECIFY)________________
- FEDERAL GOVERNMENT SOURCES
  - /__/ HYDROLOGICAL ENGINEERING CENTER
  - /__/ ENVIRONMENTAL PROTECTION AGENCY
  - /__/ SOIL CONSERVATION CENTER
  - /__/ OTHER (SPECIFY)________________
  - /__/ OTHER (SPECIFY)________________
- USER GROUPS
  - /__/ INTEGRATED CIVIL ENGINEERING SYSTEM
  - /__/ SOCIETY FOR COMPUTER APP. IN ENGINEERING, PLANNING & ARCHITECTURE
  - /__/ HIGHWAY ENGINEERS EXCHANGE PROGRAM
  - /__/ OTHER (SPECIFY)________________
- MISCELLANEOUS SOURCES
  - /__/ COMMERCIAL TIME SHARING(E.G., BOEING COMPUTER SERVICES) (SPECIFY) ________________
  - /__/ UNIVERSITY SOURCES(SPECIFY) ________________
  - /__/ PRIVATE COMPANIES (SPECIFY) ________________
  - /__/ OTHER(SPECIFY) ________________

5. IF YOU USE COMPUTER MODELS FOR ENVIRONMENTAL ANALYSIS OR PLANNING, PLEASE INDICATE THOSE NOW IN USE BY COMPLETING TABLE 3.2 - SOFTWARE REQUIREMENTS AND USAGE.

TABLE 3.2 - SOFTWARE REQUIREMENTS AND USAGE FOR MODELS

MODEL NAME *	Have you heard of or used this model? (If NO, go to next model)		Does your mission require the use of this model?		How often do you use this model?				Is this model adequate for your needs?			COMMENT ON ADEQUACY	ACCESS					COMPUTER SYSTEM (VENDOR & MODEL)	APPROX. MONTHLY CPU HOURS
	Y	N	Y	N	NOT USED	OCCASIONAL	REGULARLY	UNKNOWN	ADEQUATE	PARTIALLY ADEQUATE	INADEQUATE		ON-SITE USAF	OFF-SITE USAF	FED. GOVT. FACILITY	COMM. SERV. BUREAU	OTHER		
ARM																			
NPS																			
AFRUM																			
WHTM																			
ATM																			
AQAM																			
APRAC																			
CDM																			
CRSTER																			
PAL																			
PTDIS																			
PTMAX																			
PTMTP																			
RAM																			
VALLEY																			
EXAMS																			
PRICKETT-LONNQUIST																			
CHRIS																			
HACS																			
SAM																			

* Full names and a description on Table 3.3

NOTE: THE FOLLOWING TABLE, PROGRAM DEFINITION OF ENVIRONMENTAL MODELS, IS A REFERENCE TABLE, WHICH LISTS MOST KNOWN AIR FORCE MODELS AND MODELS USED OR PLANNED BY THE ENVIRONMENTAL PROTECTION AGENCY.

IT MAY BE HELPFUL IN FILLING OUT TABLE 3.2. ALSO, IF THERE ARE ANY PROGRAMS WHICH YOU KNOW OF THAT ARE USED FOR ENVIRONMENTAL ANALYSIS OR PLANNING WHICH ARE NOT IN THIS TABLE, PLEASE ADD THEM.

TABLE 3.5 - PROGRAM DEFINITION OF ENVIRONMENTAL MODELS SHEET 1 OF 2

ITEM ID	NAME	SOURCE	DESCRIPTION	COMPUTER	LANGUAGE
HYDROLOGY	ARM	EPA	AGRICULTURAL RUNOFF MANAGEMENT MODEL		
	NPS	EPA	NONPOINT SOURCE POLLUTANT LOADING MODEL		
	AFRUM	USAF	AIR FORCE RUNOFF MODEL		
	WHTM	ORNL	WISCONSIN HYDROLOGIC TRANSPORT MODEL		
AIR QUALITY	ATM	ORNL	ATMOSPHERIC TRANSPORT MODEL		
	AQAM	USAF	AIR QUALITY ASSESSMENT MODEL		
	APRAC	EPA	AIR POLLUTION RESEARCH ADVISORY COMMITTEE		
	CDM	EPA	CLIMATOLOGICAL DISPERSION MODEL		
	CRSTER	EPA	SINGLE SOURCE MODEL		
	PAL	EPA	POINT, AREA AND LINE SOURCE		
	PTDIS	EPA	POINT SOURCE DISPERSION AIR DISPERSION MODEL		
	PTMAX	EPA	POINT SOURCE MAXIMUM CONCENTRATION AIR POLLUTION MODEL		
	PTMTP	EPA	MULTIPLE POINT SOURCES & RECEPTORS AIR POLLUTION MODEL		

TABLE 3.3 - PROGRAM DEFINITION OF ENVIRONMENTAL MODELS SHEET 2 OF 2

ITEM ID	NAME	SOURCE	DESCRIPTION	COMPUTER	LANGUAGE
AIR QUALITY	RAM	EPA	ROBERT A. MCCORMICK: SERIES OF RURAL AND URBAN AIR POLLUTION MODELS AND PROCESSORS		
	VALLEY	EPA	AIR POLLUTION MODEL FOR COMPLEX TERRAIN		
WATER QUALITY	EXAMS	EPA	EXPOSURE ANALYSIS MODELING SYSTEM		
GROUND WATER	PRICKETT-LONNQUIST	USGS	GROUND WATER MODEL		
CHEMICAL SPILLS	CHRIS	U.S. COAST GUARD	RESPONSE SYSTEMS TO CHEMICAL SPILLS IN NAVIGATABLE WATERWAYS		
	HACS	U.S. COAST GUARD	HAZARD ASSESSMENT COMPUTER SYSTEM; "COMPUTERIZED VERSION OF CHRIS"		
	SAM	USAF	SPILL ASSESSMENT MODEL		

6. IF YOU DO NOT USE COMPUTER MODELS,

- WHY NOT?______________________________

- WOULD YOU LIKE TO USE THEM?__________
- WHICH MODELS WOULD YOU LIKE TO USE?

7. IF YOU WORK ON SATISFYING REGULATORY REQUIREMENTS, WHICH LAWS DO YOU ADDRESS? (E.G., NEPA, STATE COASTAL REGULATIONS, MUNICIPAL ZONING, ETC.)

PLEASE SPECIFY__________________________

THIS IS THE END OF THE ENVIRONMENTAL SCIENCES AND PLANNING SECTION. THERE ARE ALSO SOME QUESTIONS IN SECTION 1, MANAGEMENT AND ADMINISTRATION, WHICH ARE RELEVANT.

PLEASE GO TO PAGE 1/6 AND COMPLETE QUESTIONS 1.10 TO 1.16 AND TABLE 1.17 UNLESS YOU HAVE ALREADY DONE SO; IF YOU HAVE, GO TO SECTION 4, COMMENTS AND SUGGESTIONS ON THE FOLLOWING PAGE.

4.0 COMMENTS AND SUGGESTIONS

This is an unstructured section of the questionnaire which invites your comments and suggestions. Please note here your opinion of the questionnaire and any detailed comments, criticisms or answers to questions that should have been asked but were omitted. If you think that the questionnaire successfully covered the areas of your concern please note this also.

The basic purpose of this questionnaire is to provide information for proposals to enhance the environmental information support service available to the Air Force. This information network could include data, hardware, software and groupings of people and skills. The network could be organized and could communicate in many different ways. Please note here any thoughts and suggestions for networking environmental data and analysis techniques that you have, or improvements which you would like to see.

You may be sure that all the information that you give in this questionnaire will be carefully read and analyzed, some answers may be coded and computer analyzed. Your needs and suggestions will be the basis for further work. The more you can tell us, the more future enhancements can respond to your needs.

APPENDIX E

QUESTIONNAIRE RESPONSE ANALYSIS

SECTION I

INFORMATION GENERAL TO ALL QUESTIONNAIRE SECTIONS

Basic Data

Number of questionnaires completed	=	73
Number of groups represented	=	52
Number of Air Force Bases visited	=	6
Number of Air Force Bases represented	=	15

0.0* Contact Information

0.1 Name

0.2 Title

0.3 Group Name

0.4 Organization

0.5 Postal Address

* These numbers are the same as those used in the questionnaire.

Throughout the analysis the Air Force locations will be presented in the following order. Groups at each location are noted but do not always occur in this order in the analysis.

Survey Response	Location	Groups
Major	Tyndall AFB, FL	HQ AFESC/RDV/DEV/ACD/WE/RD BASE DEEV SGPM
	Scott AFB, IL	HQ AWS USAF ETAC HQ MAC/XGPE DCS/CIVIL BASE DEEV SGPE
	Brooks AFB, TX	USAF OEHL
	Eglin AFB, TX	AD/KRESS AD/DEEV BASE SGPE
	Randolph AFB, TX	HQ ATC/DEV BASE SGPM
Minor	Andrews AFB, MD	HQ AFES/DLWM
	Atlanta, GA	AFRCE/ER
	Dallas, TX	AFRCE/CR
	Hanscom AFB, MA	AFGL
	Hill AFB, UT	MMGF
	Kelly AFB, TX	BASE AFB/DEPD
	Los Angeles, CA	AFSC HQ SPACE
	Offut AFB, NB	HQ SAC/SGPB DCX HQ 3WW/DNC
	Ogden Engineering Center, UT	TRW/DSSG
	Robins AFB, CA	HQ AFRES/DCS
	Vandenberg AFB, CA	WSMC/SEM
	Wright-Patterson AFB, OH	HQ AFLC BASE ABW/DEEX

SECTION II

RESPONDENTS TO QUESTIONNAIRE

TYNDALL AFB, FLORIDA 32403

Lt. Col. Suriano
HQ AFESC/DEV
(Env. Planning Div.)
904-283-6166
Interviewed 6/1/81 by S. McKenzie

Mr.Zane F. Spitzer
HQ AFESC
(Computer Services)
904-283-6430
Interviewed 6/1/81 by D. Schelling

1Lt. Bill Kelly
HQ AFESC/ACD
(Computer Services)
904-283-1430
Interviewed 6/1/81 by D. Schelling

Mr. John Palmer
HQ AFESC/DEV
(Community Planning)
904-283-6229
Interviewed 6/1/81 by S. McKenzie

Mr. Lindenberg/Anderson
HQ AFESC/DEVP
(Env. Protection & Assess.)
904-283-6189
Interviewed 6/1/81 by S. McKenzie

Captains Jim Woessner & Dan Hood
HQ ADESC/WE
(Meteorology)
904-283-6290
Interviewed 6/1/81 by S. McKenzie

Col. Francis B. Crowley III
HQ AFESC/RD
(Eng. & Services)
904-283-6309
Interviewed 6/1/81 by S. McKenzie

Captain Frank Miller
USAF Hospital
(Bio-Env. Engineering SGPM)
904-283-2948
Interviewed 6/1/81 by S. McKenzie

Lt. Col. Mike Ryan
HQ AFESC
(Environics)
904-283-2803
Interviewed 6/1/81 by S. McKenzie

Major Steve Termaath
HQ AFESC/RDVW
(Env. Engineering)
904-283-4628
Interviewed 6/1/81 by S. McKenzie

Mr. William Kornman
HQ AFESC/DEVN
(Natural Resources Division)
904-283-6481
Interviewed 6/1/81 R. Long

Lt. Col. Boyd Duffie, III
HQ AFESC/DEV
(Env. Planning)
904-283-6232
Interviewed 6/1/81 by R. Long

Major Ron Hawkins
HQ AFESC/DEVP
(Env. Protection & Assessment)
904-283-6191
Interviewed 6/1/81 by R. Long

Mr. Arturo McDonald
4756 CES/DEEV
(Env. Planning)
904-283-4354
Interviewed 6/1/81 by R. Long

RESPONDENTS TO QUESTIONNAIRE (CONTINUED)

TYNDALL AFB, FLORIDA 32403

Capt. Jeff Short
HQ AFESC/DEVN
(BASH Team)
904-283-6239
Interviewed 6/1/81 by S. McKenzie

Mr. Charlie Lewis
HQ AFESC/DEVC
(Community Planning)
904-283-6254
Interviewed 6/1/81 by R. Long

Capt. Gerald Long
HQ AFESC/DEVN
(Nat. Resources Div.)
904-283-6239
Interviewed 6/1/81 by S. McKenzie

Lt. David Roe
HQ AFESC/RDVA
(Air Quality)
904-283-2803
Interviewed 6/1/81 by R. Long

Mr. Al Nixon
HQ AFESC/DEVP
(Env. Protection Planning)
904-283-6163
Interviewed 6/1/81 by D. Schelling

Robert G. Blum
HQ AFESC/RDVW
(Bio-Env. Engineering)
904-283-4628

Major Gerald Plummer
HQ AFESC/DEVC
(Aircraft Noise Analysis)
904-283-6250
Interviewed 6/1/81 by D. Schelling

Major James D. Thompson
HQ AFESC/RDVA
(Environics)
904-283-2803

Lt. Dan Berlinrut
HQ AFESC/RDVS
(Environics)
904-283-4234

1Lt. Peter Jaskilika
HQ AFESC/DEVP
(Env. Protection Planning)
904-283-6187
Interviewed 6/1/81 by D. Schelling

Captain Harvey Clewell
HQ AFESC/RDVS
(Eng. Services Branch)
904-283-4234

Major Jim Fulford
HQ AFESC/RDVP
(Env. Engineering)
904-283-2803
Interviewed 6/1/81 by D. Schelling

Daniel A. Stone
HQ AFESC/RDVC
(Env. Sciences)
904-283-4297

Gary G. Worley
HQ AFESC/RDVA
(Eng. & Services Center)

RESPONDENTS TO QUESTIONNAIRE (CONTINUED)

SCOTT AFB, ILLINOIS 62225

Mr. John R. Kahler
HQ AWS/DNKP
(Aerospace Physics)
618-256-4781
Interviewed 6/15/81 by S. McKenzie

Mr. Henry W. Caughman
DCS/CIVIL Engineering
(Env. Planning)
618-256-5895
Interviewed 6/15/81 by R. Long

Lt. Col. James W. Sartor
AWS/DOQ
(ETAC)
618-744-1949
Interviewed 6/15/81 by S. McKenzie

Captain Patrick L. Herod
USAFETAC/ENB
(Bio-Env. Engineering)
618-256-5908
Interviewed 6/15/81 by S. McKenzie

Mr. Walter S. Burgmann
USAF ETAC/TS
(Technical Services)
618-256-4044
Interviewed 6/15/81 by R. Long

Lt. Col. William E. Pickett
HQ MAC/XGPE
(Bio-Env. Engineering)
618-256-2303
Interviewed 6/15/81 by S. McKenzie

Mr. George Gauger
375 ABG/DEEV
(Env. Planning)
618-256-2092
Interviewed 6/15/81 by R. Long

Mr. Ronald C. Gilchrist
USAFETAC
(Aerospace Sciences)
618-256-5412
Interviewed 6/15/81 by R. Long

Major Al Boehm
USAF ETAC/DNP
(Aerospace Engineering)
618-256-3772
Interviewed 6/15/81 by D. Schelling

Capt. Emil Berecek
USAFETAC/DNS
(Env. Simulation)
618-256-5412
Interviewed 6/15/81 by R. Long

Major Carl Zimmerman
USAFETAC
(Automation Branch)
618-256-4440
Interviewed 6/15/81 by D. Schelling

Major Kenneth Crane
USAFETAC/CCX
(ETAC)
618-256-4440
Interviewed 6/15/81 by D. Schelling

Capt. Mike Reed
USAF Med. Center/SGPE
(Bio-Env. Engineer)
618-256-7307

Capt. Robert D. Prochaska
HQ Air Weather Service/DNKP
(Aerospace Physics)
618-256-4781

Capt. Terry L. Park
USAFETAC/ADL
(Application Prog.)
618-256-5461
Interviewed 6/15/81 by D. Schelling

Major Roger C. Whitton
USAFETAC
(Env. Simulation)
618-256-5412

RESPONDENTS TO QUESTIONNAIRE (CONTINUED)

BROOKS AFB, TEXAS 78235

Major Dennis F. Naugle
OEHL/ECA
(Env. Assessment)
512-536-3326
Interviewed 6/2/81 by S. McKenzie

Lt. Col. John J. Gokelman
OEHL
(Data Automation)
512-536-3247
Interviewed 6/3/81 by D. Schelling

Major William E. Normington
USAF OEHL/ECA
(Air Quality)
512-536-2891
Interviewed 6/3/81 by S. McKenzie

Capt. George Croshaw
USAF OEHL/RZN
(Radiation Services)
512-536-3486
Interviewed 6/3/81 by R. Long

Mr. C.D. Worthy Jr.
OEHL/ECO
(Health Branch)
512-536-2063
Interviewed 6/3/81 by D. Schelling

Mr. Thomas C. Thomas
OEHL/SAN
(Env. Chemistry)
512-536-3626
Interviewed 6/4/81 by S. McKenzie

Mr. John L. Ricci
USAF OEHL/RZO
(Radiation Services)
512-536-3486
Interviewed 6/3/81 by R. Long

Major Gary A. Fishburn
OEHL/ECW
(Water Quality)
512-536-3305
Interviewed 6/3/81 by S. McKenzie

Lt. Col. Charles E. Thalken
USAF OEHL/ECE
(Env. Assessment)
512-536-3667
Interviewed 6/3/81 by R. Long

EGLIN AFB, FLORIDA 32542

Mr. Herbert Spies
AD/KRESS
(Computer Systems Branch)
904-882-5498
Interviewed 6/2/81 by D. Schelling

Mr. Richard Hartman
AD/DEEVE
(Env. Protection)
904-882-4435
Interviewed 6/2/81 by R. Long

Mr. John Carman
AD/KRESS
(Computer Systems Branch)
904-882-3680
Interviewed 6/2/81 by S. McKenzie

Major Larry Shingler
USAF REG HOSP/SGPE
(Bio-Env. Engineering)
904-882-5873
Interviewed 6/2/81 by R. Long

RESPONDENTS TO QUESTIONNAIRE (CONTINUED)

RANDOLPH AFB, TEXAS 78148

Mr. A.E. Cullins
HQ ATC/DEV
(Env. Planning)
512-487-3240
Interviewed 6/4/81 by R. Long

Lt. Col. Jerry Dantzler
HQ ATC/DEV
(Env. Planning)
512-652-3240
Interviewed 6/4/81 by S. McKenzie

T. Sergeant Patricia Sparks
USAF Clinic/SGPM
(Aeromed. Services)
512-652-2723
Interviewed 6/4/81 by R. Long

Mr. Quincy Purvic and
Mr. Richard Phillips
(Env. Planning)
512-652-5573
Interviewed 6/4/81 by S. McKenzie

Mr. Tracy L. Smith
HQ ATC/DEV
(Community Planning)
512-652-3240
Interviewed 6/4/81 by D. Schelling

Major Ron Jones
HQ ATC/SGPAP
(Bio-Env. Engineering)
512-652-3536
Interviewed 6/4/81 by R. Long

Clifford J. Novosad
HQ ATC/DEV
(Env. Planning)
512-652-3240

Captain Don Bradford
HQ ATC/DEV
(Env. Planning)
512-652-3240
Interviewed 6/4/81 by D. Schelling
& S. McKenzie

Mr. Fred L. Reissig
HQ ATC/DEV
(Env. Planning)
512-3766
Interviewed 6/4/81 by D. Schelling

ANDREWS AFB, MARYLAND 20334

Michael A. Reed
HQ AFSC/DLWM
(Energy & Nuclear Effects Div.)

AIR FORCE REGIONAL CIVIL ENGINEER
EASTON REGION, DALLAS, TEXAS 75242

Maj. Joe C. Lafoy
AFRCE-CR/RDV
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TOTAL QUESTIONNAIRE RESPONDENTS

Area of Environmental Expertise	Number of People	Percentage
Management and Administration	40	35
Computer Systems	33	30
Environmental Science	40	35
Total	113*	100

* This number is larger than the number of questionnaire respondents because some personnel checked more than one area of expertise.

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SECTION III

RESPONSES TO QUESTIONNAIRE SECTION I

Environmental Management and Administration

1. Existing Environmental Groups

TABLE E-1. Existing Environmental Groups. (Items 1.1-1.6, 2.1-2.6, 3.1-3.6)

LOCATION	GROUP	BASIC MISSION	MISSION ELEMENTS	APPLICABLE USAF REGULATION	MISSION TYPE: BROADLY STATED	MISSION TYPE: CLOSELY STATED
Tyndall AFB Florida	BASH Team HQ AFESC/DEVN	Bird Strike (collision) Avoidance	Bird Strike data analysis. Ecological analysis. Evaluations and recommendations.			
	Bio. Envir. Engineering BASE SGPM	Support hospital industrial hygiene. Air and water pollution.		AFOSH Standards AF Regulations		
	Dir. of Env. Planning HQ AFESC/DEV	Technical assistance in Env. community planning.	Develop programs in areas of community planning.	USAF/LEE AFESC/CC		
	Eng. & Service Lab. HQ AFESC/RP	Research and development.	Env. concerns of weapon systems.			
	Env. Protect. & Assessment Division HQ AFESC/DEVP	Technical assistance for Air Force Env. programs	Technical review and process of policy on implementation of clean air, water and hazardous waste.			
	Environmental Sciences HQ AFESC/RDVC	Determine Env. fate of Air Force fuels, lubricants, etc. as employed in normal operations.	In-house and contractual investigations of the chemical and physical interaction of Air Force material in air, water and soil.		X	
	Env. Sciences Branch HQ AFESC/RDVS	Air Force Env. Research and Development relating to Air Quality.	Development of computer models of evaporation from Toxic Spills/ of fuel droplet evaporation and atmospheric free-fall.		X	

TABLE E-1. Existing Environmental Groups (Continued). (Items 1.1-1.6, 2.1-2.6, 3.1-3.6)

LOCATION	GROUP	BASIC MISSION	MISSION ELEMENTS	APPLICABLE USAF REGULATION	MISSION TYPE: BROADLY STATED	MISSION TYPE: CLOSELY STATED
Tyndall AFB Florida	Environics HQ AFESC/RDVA	Research for Env. Quality.	Air pollution modeling, water pollution modeling. Toxic material dispersion.	AFR 127-2/8/12 SFR 19-2		
Scott AFB Illinois	Aerospace HQ ANS/DNXP	Identify future requirements.	Solar optical observing network, radio telescopes, space environmental support system.	23-1	X	
	Bio.-Env. HQ MAC/XGPE	Monitoring air/water quality pollution. Hazardous waste sampling.		AFR 161/3.3, 19-7	X	
	Eng. & Env. Planning USAF ETAC	Provide environmental policy and procedure	Natural resources, community & Env. planning.	12-6, 19-1/10.	X	
	Envir. Simulation USAF ETAC	Design and test probabilistic and statistical models with which to simulate weather and electro-optical observations and forecasts.	Develop, test and apply models in specific projects.	300-series 80-series	X	
	ETAC-PLANS/ POLICY USAF ETAC	Analysis and forecasting of weather if effects military operations.		AF 105, AWF 23		
	Technical Service Branch USAF ETAC/TS	Provide Library Support.	Ref. Service. Interlibrary loan acquisitions.	AF 215-15, 212-3 ANS 215-1, AFR80-10; 80-15	X	

TABLE E-1. Existing Environmental Groups (Continued). (Items 1.1-1.6, 2.1-2.6, 3.1-3.6)

LOCATION	GROUP	BASIC MISSION	MISSION ELEMENTS	APPLICABLE USAF REGULATION	MISSION TYPE	
					BROADLY STATED	CLOSELY STATED
Brooks AFB Texas	Air Quality USAF OEHL/ECA	Assist bases on air quality problems.	Compliance with regs. ambient air sampling, diffusion work emission factors.	AFR-19-1'2/3/4/5/6		
	Env. Assess. USAF OEHL/ECE	Deal with environmental problems caused by aircraft.				
	Radiation Service Dept. USAF OEHL/RZI	Field support of radiation protection.	Radiation surveys of medical, industrial, and x-ray equip.			
	Water Quality USAF OHEL/ECW	Water discharge studies, extent of waste disposal.				
Eglin AFB Florida	Bio. Env. Engineering BASE/SGPE	Env. surveillance of activities through collection and analysis	Monitor base discharges into air/water and monitor the quality.	DOD		
	Env. Protection AD/DEEVE	Advise base organizations on laws and regulations	Manage envir. impact analysis process, hazardous waste programs.			
Randolph AFB, Texas	Bio-Env. Engineering BASE SGPM	Monitoring health aspects of Env. protection and industrial operations. Liaison between DOD and Congress.	Stream sampling, drinking water monitoring, air emission inventories. Solid waste disposal monitoring.	DOD		
	Env. Planning HQ ATC/DEV	Assist bases on environmental matters.	Env. protection program. Community planning program. Natural resources conservation program.	MajCom Civil Eng. Regs. 85/7.		

TABLE E-1. Existing Environmental Groups (Continued). (Items 1.1-1.6, 2.1-2.2.6, 3.1-3.6)

LOCATION	GROUP	BASIC MISSION	MISSION ELEMENTS	APPLICABLE USAF REGULATION	MISSION TYPE: BROADLY STATED	MISSION TYPE: CLOSELY STATED
Andrews AFB Maryland	Energy and Nuclear Effects Div. HQ AFES DLWM	Oversee technology and advanced development in the area of high energy and nuclear weapons.			X	
Atlanta Georgia	Env. Planning Division AFRCE-ER					
Dallas Texas	Env. Planning Division AFRCE-ER (AFESC)	Serve as manager at federal, state and regional level for the Air Force's Interagency Intergovernmental coordination for Env. Protection program.		AFR 19-2/9 55-2/34/48		
Hanscom AFB Massachu-setts	Middle Atmosphere Technology AFGL	Applied research on middle atmosphere effects on communi-cation, surveillance, weapons and flight systems.	Provide assessments of env. impact of Air Force flight operations in atmosphere.	AFR 19-1/2/7	X	
Hill AFB Utah	MMGF Titan II Systems Management	Integrated logistics support of the Titan II system.	Contol and disposal of Titan II propellants.			X
Kelly AFB Texas	Environmental BASE AFB/DEPD	Environmental planning and management of Kelly AFB.				

TABLE E-1. Existing Environmental Groups (Continued). (Items 1.1-1.6, 2.1-2.6, 3.1-3.6)

LOCATION	GROUP	BASIC MISSION	MISSION ELEMENTS	APPLICABLE USAF REGULATION	MISSION TYPE: BROADLY STATED	MISSION TYPE: CLOSELY STATED
Los Angeles Worldway Center, California	Envir. Protection Committee HQ SD/DE			19 Series AFR 161-22; ANSR 19-1	X	
	Dir. Group of Computer Sciences.	Computer support for env. applications.	Data storage and computation for env. models and other research and operational env. information.			
Offut AFB Nebraska	TIO ENV. HQ SAC/SGPB	Management of environmental and occupational health programs in SAC.	Technical input relative to air/water quality standards and hazardous waste impact.	19-1 series 161 series	X	
Ogden Eng. Center Clearfield Utah	Aircraft Systems TRW	Provide logistics support and technology development for military and commercial aircraft systems.	Field measurements and analytical modeling.	Air quality	X	
	Titan II Systems Engineering TRW/DSSG	Evaluate and develop modifications to enhance system performance and maintenance.	Evaluate, recommend and develpp env. hardware to minimize impact of Titan II system on environment.		X	
Robins AFB Georgia	Env. Planning Division HQ AFRES	Comprehensive env. planning, coordination and management for all AFRES Bases.	Env. base comprehensive, community, natural resources, and historic preservation.	19-1 Series; 126-1, 84-4, 91-36; 85-13/14/19		

TABLE E-1. Existing Environmental Groups (Continued). (Items 1.1-1.6, 2.1-2.6, 3.1-3.6)

LOCATION	GROUP	BASIC MISSION	MISSION ELEMENTS	APPLICABLE USAF REGULATION	MISSION TYPE: BROADLY STATED	MISSION TYPE: CLOSELY STATED
Vandenberg AFB, California	AFSC Missile Safety System WSMC/SEM	Range safety, system safety, Personnel/Public Safety.	Review/Approve Facility siting plans; Env. impact statement assessments; develop hazardous zones and criteria.	AFR 127-8		X
Wright-Patterson AFB, Ohio	Env. Planning BASE ABW/DEEX	Manage and administer the Env. natural resources, community planning and energy conservation programs.	Environmental assessment of base activities. Determination of base source compliance with environmental regulations.	AFR 19-1/2/7/8 19-1	X	

2. Personnel

1.7 Total number of fulltime equivalent staff involved in environmental tasks = 135

				Percentage
1.8	Number of High School	=	135	100
(Summary)	Number of B.S.	=	104	77
	Number of M.S.	=	60	44
	Number of Ph.D.	=	13	10

Average % staff turnover

- in past year	=	31%
- in past 2 years	=	51%
- in past 3 years	=	71%

Average 85% expecting turnover rates to be the same in the future

1.8 (Detail) See Table 2

TABLE E-2. Summary of Skills. (Item 1.8)

LOCATION	GROUP	STAFF					PERCENTAGE PERSONNEL TURNOVER					
		TOTAL NO. FULL TIME EQUIV.	EDUCATION				PAST RECORD			EXPECTED FUTURE		
			HIGH SCHOOL	BS	MS	PH.D.	PAST YEAR	PAST 2 YEARS	PAST 3 YEARS	HIGHER	SAME	LOWER
Tyndall AFB Florida	BASH Team HQ AFESC/DEVN	4	4	4	3		25%	50%			X	
	Bio-Env. Engineering BASE SGPM	7	7	5	2		30%				X	
	Dir. of Env. Planning HQ AFESC/DEV	32					25%	35%			X	
	Eng. and Services Lab HQ AFESC/RP	30					25%				X	
	Env. Protect. and Assessment Division HQ AFESC/DEVP	9	9	7	7		30%				X	
	Env. Sciences HQAFESC/RDVC	10									X	
	Environics HQ AFESC/RDVA	30					15%	25%			X	
Scott AFB Illinois	Aerospace HQ AWS/DNXP	3	3	3	3		25%				X	
	Bio-Env. HQ MAC/SGPE	5	5	3	2		33%				X	
	Eng & Env Plan DCS CIVIL	3	3	3	1		25%	25%			X	
	ETAC-PLANS/ POLICY USAF ETAC	700										

TABLE E-2. Summary of Skills (Continued). (Item 1.8)

LOCATION	GROUP	STAFF					PERCENTAGE PERSONNEL TURNOVER					
		TOTAL NO. FULL TIME EQUIV.	EDUCATION				PAST RECORD			EXPECTED FUTURE		
			HIGH SCHOOL	BS	MS	PH.D.	PAST YEAR	PAST 2 YEARS	PAST 3 YEARS	HIGHER	SAME	LOWER
Scott AFB Illinois	Technical Service Br. USAF ETAC/TS	7	7	5	3		66%	83%			X	
	Environmental Simulation USAF ETAC	5	5	5	4	2		20%		X		
Brooks AFB Texas	Air Quality USAF OEHL/ECA	5	5	4	2	1	33%				X	
	Env. Assess. USAF OEHL/ECE	10	10	6	5	4	20	5			X	
	Radiation Services Div. USAF OEHL/RZI	3	3	2	2	1	66%	66%			X	
	Water Quality SAF OEHL/ECW	5	5	2	2	1	20%				X	
Eglin AFB Florida	Bio-Env. Engineering BASE/SGPE	6	6	1			50%	75%			X	
	Env. Protection AD/DEEVE	4						25%			X	
Randolph AFB Texas	Bio-Env. Engineering BASE SGPM	14	14	14	1			100%			X	
	Env. Planning HQ ATC/DEV	18	18	16	10	1	16%					
Andrews AFB Maryland	Energy & Nuc. Effects Div. HQ AFES/DLWM	1	1	1	1				100%		X	

TABLE E-2. Summary of Skills (Continued) (Item 1.8)

LOCATION	GROUP	STAFF					PERCENTAGE PERSONNEL TURNOVER					
		TOTAL NO. FULL TIME EQUIV.	EDUCATION				PAST RECORD			EXPECTED FUTURE		
			HIGH SCHOOL	BS	MS	PH.D.	PAST YEAR	PAST 2 YEARS	PAST 3 YEARS	HIGHER	SAME	LOWER
Dallas Texas	Env. Planning Division AFRCE-CR	8	8	7	3		20%	50%	75%		X	
Hill AFB Utah	Titan II System Management MMGF	19	19	6	1		45%	65%	90%			X
Kelly AFB Texas	Environmental BASE AFB/DEPD	1	1	1								
Offut AFB Nebraska	SAC/SGPB	2	2	2	2			50%			X	
Odgen Eng. Center Clearfield Utah	Titan II Systems Eng. HQ AFRES/DCS	3	3	3				30%	10%		X	
Robins AFB Georgia	Env. Planning Div. HQ AFRES/DCS	3	3	3	2	1				X		
Wright-Patterson Ohio	Env. Planning Section BASE AFW/DEEX	5	5	5	4	2	20%	60%	80%		X	

3. Computer Hardware

(Summary)

Number of separate mainframes used for environmental tasks = 8

CYBER 176

HONEYWELL 6635

VAX 11/780 (mini) 2 systems

CDC 6600 2 Systems

BURROUGHS B3500

2HP 1000 (mini)

IBM 4341

PDP 11/45 (mini) 7 systems

1.9 See Table 3

(Detail)

TABLE E-3. Computer Hardware in Use. (Item 1.9)

LOCATION	GROUP	HARDWARE IN USE FOR ENVIRONMENTAL ANALYSIS	SUITABILITY OF COMPUTER HARDWARE	STANDARD COMPUTER HARDWARE PROCUREMENT PROCEDURE
Tyndall AFB Florida	Bio-Env. Engineering BASE SGPM	Programmable calculators	Suitable	
	Eng. and Service Lab. HQ AFESC/RP	CDC mainframe and programmable calculators	Suitable	
	Env. Protect. & Assessment Div. HQ AFESC/DEVP	Terminal to VAX 11/780 @ Champagne	Suitable but slow	Apply through section that handles ACD procurement
	Environics HQ AFESC/RDVA	Hp 45/98, Tektronix micro, 6 desk top calculators Mainframe CDC 6600 Cyber 176 @ Eglin	Suitable	
	Env. Sciences HQ AFESC/RDVC	Desk top calculators, mini-computers	Suitable	
	Aircraft Noise Analysis HQ AFESC/DEVC	Cyber 176 - Mainframe @ Eglin		
	Computer Services HQ AFESC/ACD	2 RJE stations, 1 dial up, 2 Tektronix 4054 Calcomp 935, 40 in. plotter		
	RDVA	CDC 6600		
Scott AFB Illinois	Bio-Env. HQ MAC/AGPE	Programmable calculators IBM 4341		DAR, SON proposals
	Aerospace USAF ETAC	IBM 4341 Mainframe-2 megabytes. PDP 11/45 - 224 k bytes Versatec 158 plotter on DEC		

TABLE E-3. Computer Hardware in Use (Continued). (Item 1.9)

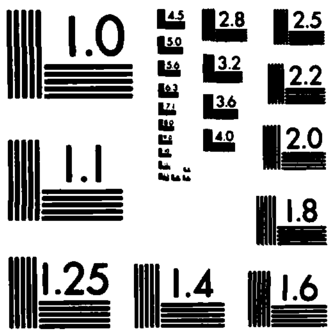
LOCATION	GROUP	HARDWARE IN USE FOR ENVIRONMENTAL ANALYSIS	SUITABILITY OF COMPUTER HARDWARE	STANDARD COMPUTER HARDWARE PROCUREMENT PROCEDURE
Scott AFB Illinois	Environmental Simulation USAF ETAC	DEC 10 with ARPANET-8 terminal PDP 11/45 8 terminals IBM 4341 wang desk top; prog. calculators, HP 65, TI 59 Versatec plotter	Inadequate disk space.	MAC/AD
	ETAC	5 Univac, 20 printers.	Suitable	DAR, HQ AVS
	Technical Service Br. USAF ETAC/TS	PDP 11/45		
	Data Automation USAF ETAC	IBM 4341 - 2 Megabytes PDP 11/45 224 k bytes Versatec plotter on DEC		
Brooks AFB Texas	Air Quality USAF ETAC/ECA	Programmable calculators		Standard military procurement procedure
	Env. Assess. USAF OEHL/ECE	Programmable calculators		
	Water Quality	Programmable calculators		(SON)
	Data Automation	Dial mini, 2 HP 1000		
	Radiation Services USAF OEHL/RZI	HP 1000 HP 9835		
Eglin AFB Florida	Computer Systems Br. AD/KRESS	Cyber 176 2CDC 6600 VAX 11/780 262 k words		
Randolph AFB Texas	Env. Planning HQ ATC/DEV	Programmable calculators	Unsuitable	Prepare feasibility study write data applications req. (DAR) (SOW) (SON)

TABLE E-3. Computer Hardware in Use (Continued). (Item 1.9)

LOCATION	GROUP	HARDWARE IN USE FOR ENVIRONMENTAL ANALYSIS	SUITABILITY OF COMPUTER HARDWARE	STANDARD COMPUTER HARDWARE PROCUREMENT PROCEDURE
Dallas Texas	Env. Planning AFRES-CR	Desk top computer terminal.	Unsuitable	
Los Angeles Worldway Center, CA	Environmental Protect. Comm. HQ SD/WE		Unsuitable for handling complex terrain and diffusion problems.	
Robins AFB Georgia	Env.Planning Division HQ AFRES	Access to Univ. of Illinois CERL via TI-745 and FTS phone support	Not suitable, modelling capability limited to ETIS availability	DAR
Wright-Patterson Ohio	Env. Planning BASE AFB/DEEX	CRT terminal/printer with phone interconnect Honeywell 635 Mainframe 256 k words	Suitable	

AD-A133 453 FEASIBILITY STUDY FOR AN AIR FORCE ENVIRONMENTAL MODEL AND DATA EXCHANGE..(U) GENERAL SOFTWARE CORP LANDOVER MD S MCKENZIE ET AL. AUG 83 AFESC/ESL-TR-82-13-VOL-2 3/4

UNCLASSIFIED F/G 9/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

4. Use of Outside Resource

TABLE E-4. Use of Outside Resources, Percentage of All Groups. (Item 1.10, 1.11)

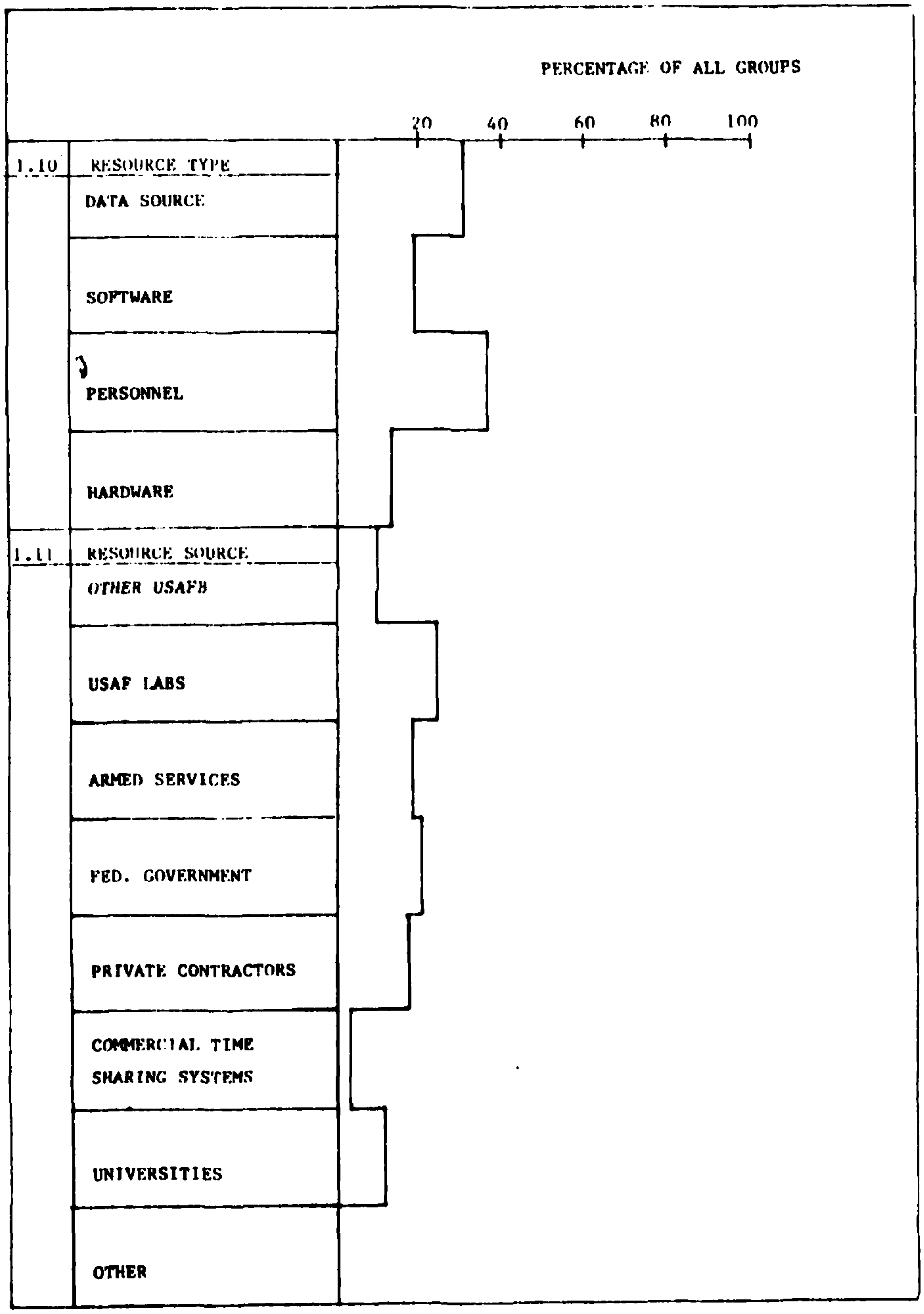


TABLE E-5. Use of Outside Resources. (Items 1.10, 1.11, 1.12)

LOCATION	GROUP	TYPE: DATA	TYPE: SOFTWARE	TYPE: PERSONNEL	TYPE: HARDWARE	SOURCE: OTHER USAFB'S	SOURCE: USAF LABS	SOURCE: ARMED SERVICES FAC.	SOURCE: FED. GOVT. FAC.	SOURCE: PRIVATE CONTRACTORS	SOURCE: COMMERCIAL T/S SYSTEMS	SOURCE: UNIV.	SOURCE: OTHER	MOST SUCCESSFUL	LEAST SUCCESSFUL
Tyndall AFB Florida	BASH Team HQ AFESC/DEVN	X	X	X	X	X	X			X		X		Data Retrieval	
	Dir. of Env. HQ AFESC/DEV	X	X	X			X	X	X	X					
	Eng. and Services Lab. HQ AFESC/RP	X		X		X	X	X	X	X		X			
	Environmental Protection & Assess. Div. HQ AFESC/DEVP	X	X	X	X			X	X	X				EEIS Program	
	Environics HQ AFESC/RDVA		X	X	X		X	X	X	X					
Scott AFB Illinois	Aerospace HQ AWS/DNXP	X	X	X	X		X					X			
	Bio-Env. HQ MAC/SGPB	X		X		X	X		X						
	Eng. & Env. Planning DCS/CIVIL						X								
	Environmental Simulation USAF ETAC				X		X			X					
	ETAC - PLANS/POLICY USAF ETAC	X	X												
	Technical Services Br. USAF ETAC/TS	X		X				X	X	X	X				

TABLE E-5. Use of Outside Resources (Continued). (Items 1.10, 1.11, 1.12)

LOCATION	GROUP	TYPE: DATA	TYPE: SOFTWARE	TYPE: PERSONNEL	TYPE: HARDWARE	SOURCE: OTHER USAFB'S	SOURCE: USAF LABS	SOURCE: ARMED SERVICES FAC.	SOURCE: FED. GOVT. FAC.	SOURCE: PRIVATE CONTRACTORS	SOURCE: COMMERCIAL T/S SYSTEMS	SOURCE: UNIV.	SOURCE: OTHER	MOST SUCCESSFUL	LEAST SUCCESSFUL
Brooks AFB Texas	Air Quality USAF OEHL/ECA	X	X	X		X	X	X	X	X		X		Data	
	Environmental Assessment USAF OEHL/ECE		X	X								X		Statistical Analysis Techniques	
	Radiation Service USAF OEHL/RZI			X	X									Computer Support	
	Water Quality USAF OEHL/ECW	X		X			X	X	X	X		X		Water Sampling	
Eglin AFB Florida	Bio-Env. Engineering BASE/SGPE	X		X			X							Data Analysis	
	Environmental Protection AD/DEEVE	X		X		X	X	X	X	X		X		Data Personnel	
Randolph AFB Texas	Environmental Planning HQ ATC/DEV	X	X	X	X	X	X	X	X	X		X			
Dallas Texas	Env. Planning Div. AFRCE-CR	X		X	X	X	X	X	X		X				
Hill AFB Utah	Titan II Systems Management MMGF	X	X	X	X				X	X		X			

TABLE E-5. Use of Outside Resources (Continued). (Items 1.10, 1.11, 1.12)

LOCATION	GROUP	TYPE: DATA	TYPE: SOFTWARE	TYPE: PERSONNEL	TYPE: HARDWARE	SOURCE: OTHER USAFHS	SOURCE: USAF LABS	SOURCE: ARMED SERVICES FAC.	SOURCE: FED. GOVT. FAC.	SOURCE: PRIVATE CONTRACTORS	SOURCE: COMMERCIAL T/S SYSTEMS	SOURCE: UNIV.	SOURCE: OTHER	MOST SUCCESSFUL	LEAST SUCCESSFUL
Kelly AFB Texas	Environmental BASE AFB/DEPD			X		X	X	X	X			X		Data	
Los Angeles Worldway Center, CA	Environmental Protection Committee HQ SD/DE	X	X	X		X	X	X	X	X	X	X		ETAC, USAFGNG	
Offut AFB Nebraska	SAC/SGPB	X					X							AFESC USAFOEHL	
Ogden Eng. Center Clearfield Utah	Titan II Systems Eng. TRW/DSSG	X		X			X			X				Private Contractor	
Robins AFB Georgia	Env. Planning Division HQ AFESC/DCS	X	X	X	X			X				X		ETIS via CERL	
Wright-Patterson AFB, Ohio	Environmental Planning BASE AFW/DEEX	X	X		X	X						X			

TABLE E-5. Use of Outside Resources (Continued). (Items 1.13, 1.14, 1.15, 1.16)

LOCATION	GROUP	LEARNING MODE						ACCESS ADEQUATE				INFO. NETWORK				BARRIERS TO OUTSIDE RESOURCE USE										
		TECHNICAL JOURNAL	CONFERENCE	USAF NEWSLETTER	USAF SEMINAR	WORD OF MOUTH	OTHER	FULLY ENOUGH	NEARLY ENOUGH	NOT ENOUGH	NOT AT ALL	ESSENTIAL	VERY USEFUL	USEFUL	NOT USEFUL	IN HOUSE CAPABILITY	LACK OF KNOWLEDGE	LACK OF TIME	LACK OF MEANS	LACK OF INHOUSE SKILLS	LACK OF TIME TO LEARN	PREFERENCE TO INHOUSE TECHNIQUES	UNWILLINGNESS OF OTHER AGENCIES TO PROVIDE	LACK OF DOCUMENTATION	OTHER	OTHER
Tyndall AFB Florida	BASH Team HQ AFESC DEVN	X	X			X			X					X			X	X					X	X		
	Bio-Env. Engineering BASE SGPM	X	X	X	X	X		X						X		X										
	Dir. of Env. Planning HQ AFESC/DEV	X	X	X	X	X				X		X					X	X	X			X				
	Eng. and Services Lab HQ AFESC/RP	X	X	X	X	X							X													
	Env. Protect & Assessment Division HQ AFESC/DEVP	X	X			X		X					X				X	X								
	Env. Sciences HQ AFESC/RDVC	X	X							X			X				X	X	X							
	Environics HQ AFESC/RDVA	X	X		X	X	X		X				X			X	X	X			X	X				
Scott AFB Illinois	Aerospace HQ AWS/DNXP	X	X		X	X	X	X						X				X	X	X	X	X				
	Bio-Env. HQ MAC XGPE	X	X	X	X	X	X			X			X				X		X	X						
	Eng. & Env. Planning DCS/CIVIL	X	X		X	X	X	X						X							X	X				
	Environmental Simulation CSAF ETAC	X	X			X				X				X			X		X			X		X		

TABLE E-5. Use of Outside Resources (Continued). (Items 1.13, 1.14, 1.15, 1.16)

LOCATION	GROUP	LEARNING MODE						ACCESS ADEQUATE				INFO. NETWORK				BARRIERS TO OUTSIDE RESOURCES USE										
		TECHNICAL JOURNAL	CONFERENCE	USAF NEWSLETTER	USAF SEMINAR	WORD OF MOUTH	OTHER	FULLY ENOUGH	NEARLY ENOUGH	NOT ENOUGH	NOT AT ALL	ESSENTIAL	VERY USEFUL	USEFUL	NOT USEFUL	IN HOUSE CAPABILITY	LACK OF KNOWLEDGE	LACK OF TIME	LACK OF MEANS	LACK OF INHOUSE SKILLS	LACK OF TIME TO LEARN	PREFERENCE TO INHOUSE TECHNIQUES	UNWILLINGNESS OF OTHER AGENCIES TO PROVIDE	LACK OF DOCUMENTATION	OTHER	OTHER
Scott AFB Illinois	ETAC - PLANS/POLICY USAF	X	X	X	X				X						X											
	Technical Services Br. USAF ETAC/TS	X	X			X	X			X					X											
Brooks AFB Texas	Air Quality USAF OEHL/ECA	X	X	X		X		X				X					X	X								
	Environmental Assessment USAF OEHL/ECE								X				X			X	X	X	X	X	X			X		
	Radiation Services Div. USAF OEHL/RZI									X			X				X									
	Water Quality USAF OEHL/ECW	X	X		X	X			X	X				X			X	X	X	X						
Eglin AFB Florida	Bio-Env. Engineering BADE/SGPE	X		X	X	X				X			X				X	X		X						
	Environmental Protection AD/DEEVE	X	X			X			X				X					X	X							
Randolph AFB Texas	Bio-Env. Engineering BASE SGPM	X	X	X	X	X		X					X				X	X								
	Environmental Engineering HQ ATC/DEV	X	X	X	X	X				X		X					X	X	X	X	X					

TABLE E-5. Use of Outside Resources (Continued). (Items 1.13, 1.14, 1.15, 1.16)

LOCATION	GROUP	LEARNING MODE						ACCESS ADEQUATE				INFO. NETWORK				BARRIERS TO OUTSIDE RESOURCE USE										
		TECHNICAL JOURNAL	CONFERENCE	USAF NEWSLETTER	USAF SEMINAR	WORD OF MOUTH	OTHER	FULLY ENOUGH	NEARLY ENOUGH	NOT ENOUGH	NOT AT ALL	ESSENTIAL	VERY USEFUL	USEFUL	NOT USEFUL	IN HOUSE CAPABILITY	LACK OF KNOWLEDGE	LACK OF TIME	LACK OF MEANS	LACK OF INHOUSE SKILLS	LACK OF TIME TO LEARN	PREFERENCE TO INHOUSE TECHNIQUES	UNWILLINGNESS OF OTHER AGENCIES TO PROVIDE	LACK OF DOCUMENTATION	OTHER	OTHER
Andrews AFB, MD	Energy & Nuclear Effects Div. HQ AFES DLAN									X				X			X	X	X							
Dallas Texas	Env. Planning Div.	X	X	X		X			X				X			X	X									
Hill AFB Utah	Titan II Systems Management MMGF	X	X		X	X				X			X				X	X		X						
Kelly AFB Texas	Environmental BASE AFB/DEPD	X	X	X	X		X							X			X	X								
Los Angeles Worldway Center, CA	Environmental Protection Committee HQ SD NE	X	X	X	X	X			X			X				X	X	X								
Offut AFB Nebraska	SAC/SGPB		X	X		X			X				X				X									
Odgen Eng. Center Clearfield Utah	Titan II Systems Eng. TRW/DSSG		X			X				X			X				X		X							

TABLE E-5. Use of Outside Resources (Continued). (Items 1.13, 1.14, 1.15, 1.16)

		LEARNING MODE						ACCESS ADEQUATE				INFO. NETWORK				BARRIERS TO OUTSIDE RESOURCE USE										
LOCATION	GROUP	TECHNICAL JOURNAL	CONFERENCE	USAF NEWSLETTER	USAF SEMINAR	WORD OF MOUTH	OTHER	FULLY ENOUGH	NEARLY ENOUGH	NOT ENOUGH	NOT AT ALL	ESSENTIAL	VERY USEFUL	USEFUL	NOT USEFUL	IN HOUSE CAPABILITY	LACK OF KNOWLEDGE	LACK OF TIME	LACK OF MEANS	LACK OF INHOUSE SKILLS	LACK OF TIME TO LEARN	PREFERENCE TO INHOUSE TECHNIQUES	UNWILLINGNESS OF AGENCIES TO PROVIDE	LACK OF DOCUMENTATION	OTHER	OTHER
Robins AFB Georgia	Env. Planning Division HQ AFRES/DCS	X				X				X		X							X							
Wright-Patterson AFB, Ohio	Env. Planning Section BASE ABW/DEEX					X			X				X				X									

TABLE L-6. Learning Modes, Computer Access, and Wish to Network - Percentage of All Groups. (Items 1.13, 1.14, 1.15)

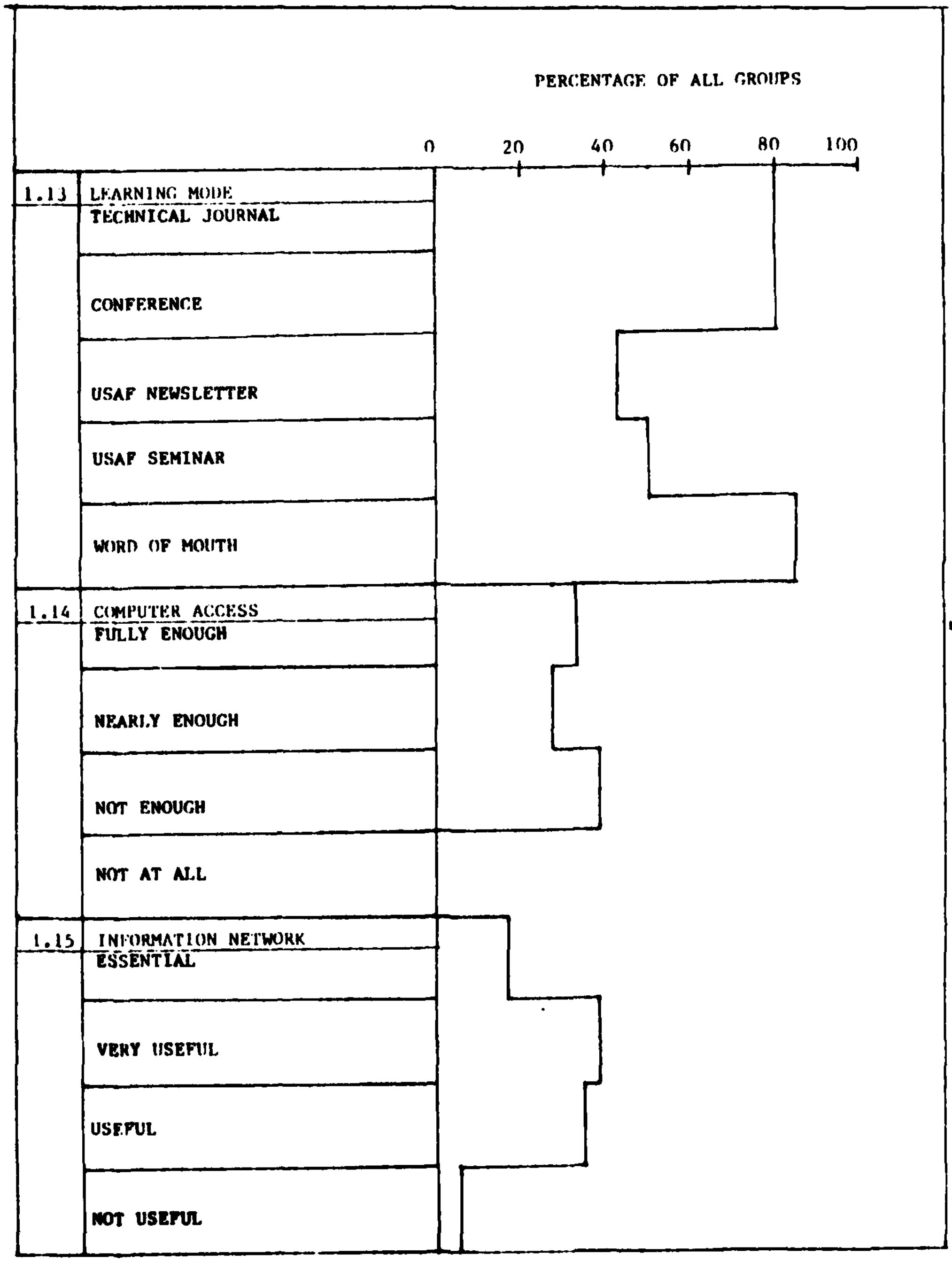


TABLE E-7. Barriers to Use of Outside Resources - Percentage of All Groups. (Item 1.16)

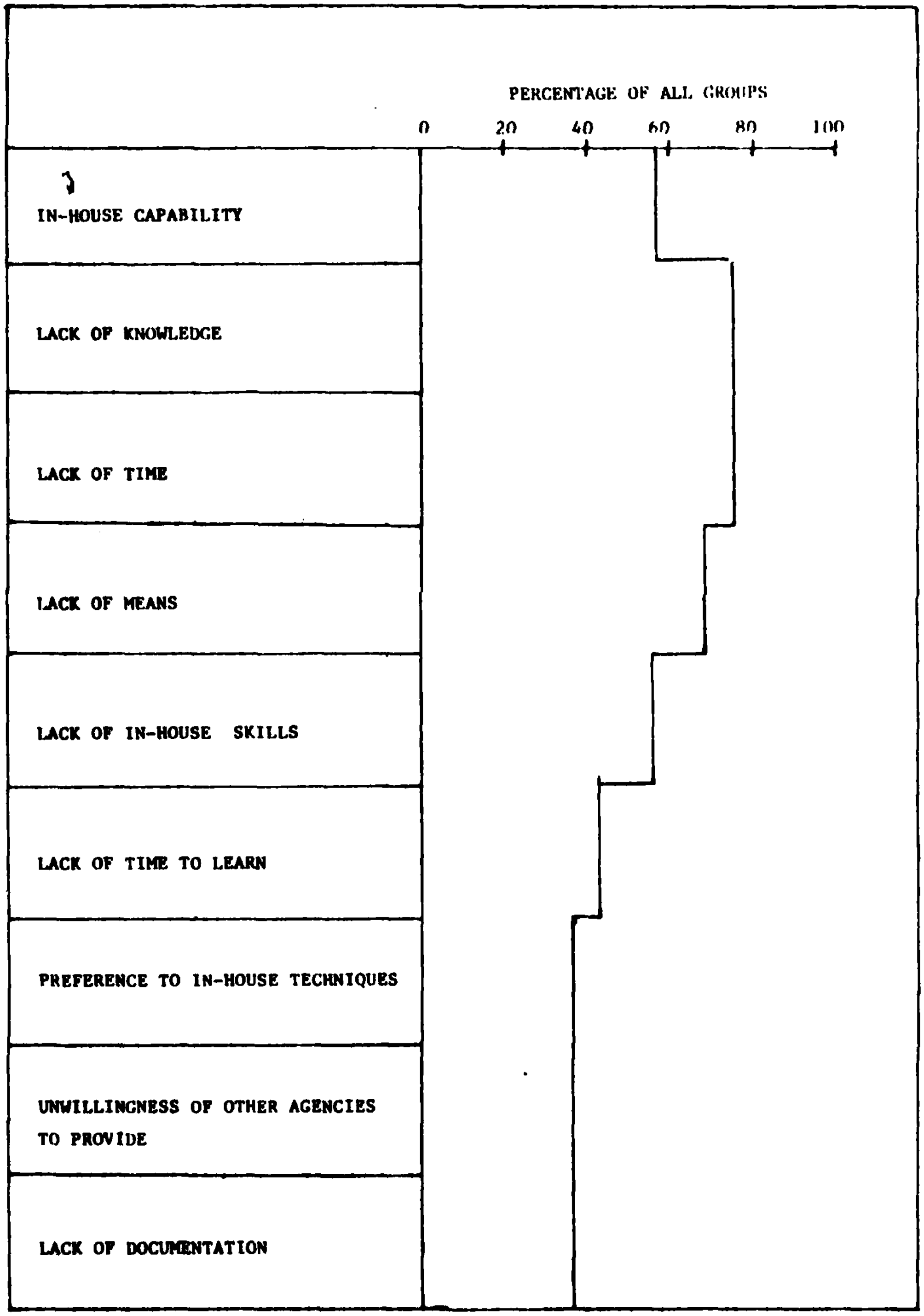


TABLE E-8. Current Activities and Adequacy of Resources. (Item 1.17)

5. Current Activities and Adequacy of Resources

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Tyndall AFB, FL	BASH Team HQ AFESC/ DEVN	Major Act.								4					
		Frequently				4							4		
		Occasional	4		4			4			4				
		Res. Adeq.				4									
		Res. Part Adeq.	4		4			4	4				4		
		Res. Inadeq.									4				
		More Skills	4		4			4	4		4		4		
		More People	4		4				4				4		
		More Hardware						4	4		4				
		More Data									4				
		More Contact													
	Bio-Env. Engineering BASE SGPM	Major Act.													
		Frequently								7					
		Occasional	7	7					7						
		Res. Adeq.							7	7					
		Res. Part Adeq.	7	7											
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Tyndall AFB, FL	BASH Team HQ AFESC/ DEVN	Major Act.													
		Frequently													
		Occasional			4	4									
		Res. Adeq.				4									
		Res. Part Adeq.			4										
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data			4										
		More Contact													
	Bio-Env. Engineering BASE SGPM	Major Act.													
		Frequently													
		Occasional	7		7										
		Res. Adeq.	7		7										
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Tyndall AFB, FL (Continued)	Dir. of Environmental Planning HQ AFESC/DEV	Major Act.								32					
		Frequently					32				32				
		Occasional	32		32	32			32				32		
		Res. Adeq.													
		Res. Part Adeq.			32	32	32		32	32	32		32		
		Res. Inadeq.	32												
		More Skills													
		More People	32				32		32						
		More Hardware								32					
		More Data									32				
		More Contact				32					32				
	Eng. & Services Lab. HQ AFESC/RP	Major Act.	30		30	30				30					
		Frequently					30	30							
		Occasional		30					30						
		Res. Adeq.					30	30	30	30					
		Res. Part Adeq.	30	30		30									
		Res. Inadeq.			30										
		More Skills													
		More People	30												
		More Hardware		30	30										
		More Data	30												
		More Contact			30	30									

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Tyndall AFB, FL (Continued)	Dir. of Environmental Planning HQ AFESC/DEVN	Major Act.	32												
		Frequently							32				32		
		Occasional				32	32					32			
		Res. Adeq.				32							32		
		Res. Part Adeq.	32				32		32			32			
		Res. Inadeq.													
		More Skills	32						32			32			
		More People	32						32			32			
		More Hardware	32												
		More Data	32						32				32		
		More Contact	32												
	Eng. & Service Lab. HQ AFESC/RP	Major Act.													
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued) (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Tyndall AFB, FL (Continued)	Environmental Protection & Assessment Division HQ AFESC/DEVP	Major Act.				9									
		Frequently													
		Occasional			9		9	9	9	9			9	9	
		Res. Adeq.													
		Res. Part Adeq.					9								
		Res. Inadeq.			9	9		9	9	9			9	9	
		More Skills													
		More People			9										
		More Hardware													
		More Data			9	9									
		More Contact			9	9									
	Environmental Sciences HQ AFESC/RDVC	Major Act.													
		Frequently													
		Occasional					10		10						
		Res. Adeq.					10		10						
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Tyndall AFB, FL (Continued)	Environmental Protection & Assessment Division HQ AFESC/DEVP	Major Act.													
		Frequently	9												
		Occasional				9									
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.	9			9									
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													
	Environmental Sciences HQ AFESC/RDVC	Major Act.													
		Frequently						10							
		Occasional	10			10	10		10	10	10	10	10		
		Res. Adeq.	10			10	10		10	10	10	10	10		
		Res. Part Adeq.						10							
		Res. Inadeq.													
		More Skills						10							
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. CUrrent Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Tyndall AFB, FL (Continued)	Environmental Services Branch HQ AFESC/RDVS	Major Act.													
		Frequently									X				
		Occasional	X	X						X					
		Res. Adeq.	X	X						X	X				
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													
	Environics HQ AFESC/RDVA	Major Act.													
		Frequently		30		30			30						
		Occasional	30		30		30	30		30	30				
		Res. Adeq.													
		Res. Part Adeq.	30	30	30	30	30	30	30						
		Res. Inadeq.								30	30				
		More Skills													
		More People	30	30		30	30	30	30		30				
		More Hardware		30							30				
		More Data													
		More Contact	30	30		30									

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Tyndall AFB, FL (Continued)	Environmental Services Branch HQ AFESC/RDVS	Major Act.													
		Frequently							X		X	X	X	X	
		Occasional					X	X		X					
		Res. Adeq.					X	X	X	X	X	X	X	X	
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													
	Environics HQ AFESC/RDVA	Major Act.													
		Frequently													
		Occasional				30	30		30		30	30			
		Res. Adeq.					30		30						
		Res. Part Adeq.				30						30			
		Res. Inadeq.									30				
		More Skills													
		More People				30			30		30	30			
		More Hardware													
		More Data				30									
		More Contact				30			30						

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Scott AFB, IL	Aerospace HQ AWS/DNXP	Major Act.													
		Frequently													
		Occasional				3	3	3	3	3		3	3		
		Res. Adeq.				3				3					
		Res. Part Adeq.					3	3	3			3	3		
		Res. Inadeq.													
		More Skills													
		More People					3	3	3			3	3		
		More Hardware										3	3		
		More Data													
		More Contact													
	Bio-Env. HQ MAC/XGPE	Major Act.													
		Frequently				5	5			5		5	5		
		Occasional			5										
		Res. Adeq.								5					
		Res. Part Adeq.			5	5									
		Res. Inadeq.					5					5	5	5	5
		More Skills													
		More People													
		More Hardware			5	5	5								
		More Data										5	5		
		More Contact				5									

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Scott AFB, IL (Continued)	Aerospace HQ AWS/DNXP	Major Act.													
		Frequently													
		Occasional	3	3	3										
		Res. Adeq.													
		Res. Part Adeq.	3	3	3										
		Res. Inadeq.													
		More Skills													
		More People	3	3	3										
		More Hardware													
		More Data													
		More Contact													
	Bio-Env. HQ MAC/XGPE	Major Act.													
		Frequently	5							5	5	5	5	5	
		Occasional		5	5	5			5						
		Res. Adeq.				5									
		Res. Part Adeq.													
		Res. Inadeq.	5	5	5				5	5	5	5	5	5	
		More Skills							5	5	5	5	5		
		More People							5	5	5	5	5		
		More Hardware													
		More Data		5											
		More Contact												5	

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Scott AFB, IL (Continued)	Eng. & Env. Planning DCS/CIVIL	Major Act.													
		Frequently	3	3				3	3						
		Occasional								3					
		Res. Adeq.		3				3	3	3					
		Res. Part Adeq.	3												
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													
	ETAC - Plans/ Policy USAF ETAC	Major Act.	X	X		X	X	X	X	X					
		Frequently										X			
		Occasional			X						X		X		
		Res. Adeq.	X			X		X			X	X	X		
		Res. Part Adeq.		X			X		X	X					
		Res. Inadeq.			X										
		More Skills			X					X					
		More People					X		X	X					
		More Hardware	X	X	X	X	X		X	X	X	X	X		
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Scott AFB, IL (Continued)	Eng. & Env. Planning DCS/CIVIL	Major Act.													
		Frequently			3										
		Occasional	3	3		3									
		Res. Adeq.		3	3	3									
		Res. Part Adeq.	3												
		Res. Inadeq.													
		More Skills													
		More People	3												
		More Hardware													
		More Data													
		More Contact													
	ETAC - Plans/ Policy USAF ETAC	Major Act.					X		X	X	X	X	X		
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.					X		X	X	X	X	X		
		Res. Inadeq.													
		More Skills							X	X	X	X	X		
		More People							X	X	X	X	X		
		More Hardware					X		X	X	X	X	X		
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Scott AFB, IL (Continued)	Environmental Simulation USAF ETAC	Major Act.					5				5				
		Frequently				5						5			
		Occasional							5	5					
		Res. Adeq.					5								
		Res. Part Adeq.				5			5	5					
		Res. Inadeq.									5	5			
		More Skills									5				
		More People							5		5				
		More Hardware				5					5				
		More Data													
		More Contact													
	Technical Services Branch USAF ETAC/TS	Major Act.	7		7	7	7	7	7	7					
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.	7		7	7			7	7					
		Res. Inadeq.						7							
		More Skills	7			7			7						
		More People				7			7	7					
		More Hardware					7		7						
		More Data						7							
		More Contact	7		7	7			7						

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Scott AFB, IL (Continued)	Environmental Simulation USAF ETAC	Major Act.													
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													
	Technical Services Branch USAF ETAC/TS	Major Act.													
		Frequently												7	
		Occasional					7		7	7	7	7	7		
		Res. Adeq.													
		Res. Part Adeq.					7		7	7	7	7	7	7	
		Res. Inadeq.													
		More Skills					7		7	7	7	7	7	7	
		More People													
		More Hardware													
		More Data													
		More Contact							7	7	7	7	7	7	

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Brooks AFB, TX	Air Quality USAF OEHL/ECA	Major Act.	5	5		5									
		Frequently													
		Occasional					5	5	5	5	5		5		
		Res. Adeq.	5	5					5	5			5		
		Res. Part Adeq.					5	5							
		Res. Inadeq.				5						5			
		More Skills													
		More People					5	5							
		More Hardware				5						5			
		More Data													
		More Contact													
	Environmental Assessment USAF OEHL/ECE	Major Act.													
		Frequently	10	10		10				10	10				
		Occasional										10	10		
		Res. Adeq.													
		Res. Part Adeq.	10	10		10				10					
		Res. Inadeq.									10				
		More Skills													
		More People													
		More Hardware									10				
		More Data									10				
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Brooks AFB, TX (Continued)	Air Quality USAF OEHL/ECA	Major Act.													
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													
	Environmental Assessment USAF OEHL/ECE	Major Act.													
		Frequently													
		Occasional	10			10			10	10	10	10	10	10	
		Res. Adeq.				10									
		Res. Part Adeq.	10						10	10	10	10	10	10	
		Res. Inadeq.													
		More Skills							10	10	10	10	10	10	
		More People	10						10	10	10	10	10	10	
		More Hardware	10												
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Brooks AFB, TX	Radiation Services Division USAF OEHL/RZI	Major Act.	3								3				
		Frequently				3				3					
		Occasional		3			3		3				3		
		Res. Adeq.								3					
		Res. Part Adeq.	3			3	3		3		3		3		
		Res. Inadeq.		3											
		More Skills	3				3								
		More People	3												
		More Hardware	3	3											
		More Data									3		3		
		More Contact													
	Water Quality USAF OEHL/ECW	Major Act.		5		5		5	5						
		Frequently	5								5				5
		Occasional													
		Res. Adeq.													5
		Res. Part Adeq.	5			5		5	5		5				
		Res. Inadeq.		5											
		More Skills													
		More People	5	5		5		5	5		5				
		More Hardware				5		5	5						
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Brooks AFB, TX (Continued)	Radiation Services Division USAF OEHL/RZI	Major Act.													
		Frequently										3			
		Occasional		3	3		3		3	3			3		
		Res. Adeq.		3											
		Res. Part Adeq.			3		3		3	3		3	3		
		Res. Inadeq.													
		More Skills				3	3			3		3	3		
		More People							3	3					
		More Hardware													
		More Data													
		More Contact													
	Water Quality USAF OEHL/ECW	Major Act.													
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Dallas, TX	Environmental Planning Division AFRCE-CR	Major Act.		8		8	8			8					
		Frequently													
		Occasional	8		8			8	8				8	8	
		Res. Adeq.	8	8	8		8	8		8	8	8		8	8
		Res. Part Adeq.				8			8				8		
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data											8		
		More Contact					8			8					
Hill AFB, UT	Titan II Systems Management MMGF	Major Act.													
		Frequently										19			
		Occasional		19	19	19		19	19	19	19		19		
		Res. Adeq.													
		Res. Part Adeq.			19	19	19	19	19	19		19	19		
		Res. Inadeq.	19	19							19			19	19
		More Skills	19		19			19			19	19	19	19	19
		More People	19		19	19		19	19						
		More Hardware								19	19				
		More Data										19			
		More Contact	19	19											

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Dallas, TX (Continued)	Environmental Planning Division AFREC-CR	Major Act.													
		Frequently				8									
		Occasional	8	8	8										
		Res. Adeq.	8	8	8	8									
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													
Hill AFB, UT (Continued)	Titan II Systems Management MMGF	Major Act.													
		Frequently					19								
		Occasional	19	19	19	19		19	19			19	19	19	
		Res. Adeq.					19								
		Res. Part Adeq.	19	19	19	19		19	19			19	19	19	
		Res. Inadeq.								19	19				
		More Skills	19	19	19	19		19	19	19	19	19	19		
		More People	19	19	19	19	19							19	
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Randolph AFB, TX	Bio-Env. Engineering BASE SGPM	Major Act.													
		Frequently													
		Occasional	14				14	14		14		14	14		
		Res. Adeq.					14			14					
		Res. Part Adeq.	14					14				14			
		Res. Inadeq.											14		
		More Skills					14	14				14			
		More People					14	14							
		More Hardware													
		More Data													
		More Contact													
	Environmental Planning HQ ATC/DEV	Major Act.				18									
		Frequently					18	18	18						
		Occasional	18							18	18	18	18	18	
		Res. Adeq.				18	18	18	13	18		18	18		
		Res. Part Adeq.	18												
		Res. Inadeq.									18			18	
		More Skills	18								18			18	
		More People	18								18				
		More Hardware	18								18			13	
		More Data	18								13				
		More Contact	18												

TABLE E-8. Current Activities and Adequacy Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Randolph AFB, TX (Continued)	Bio-Env. Engineering BASE SGPM	Major Act.													
		Frequently													
		Occasional		14											
		Res. Adeq.		14											
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data		14											
		More Contact													
	Environmental Planning HQ ATC/DEV	Major Act.	18	18	18										
		Frequently													
		Occasional				18									
		Res. Adeq.		18	18	18									
		Res. Part Adeq.													
		Res. Inadeq.	18												
		More Skills													
		More People	18												
		More Hardware	18												
		More Data	18												
		More Contact	18												

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Los Angeles Worldway Center, CA	Environmental Protection HQ SD/WE	Major Act.	X	X											
		Frequently				X				X					
		Occasional									X				
		Res. Adeq.				X				X					
		Res. Part Adeq.	X	X											
		Res. Inadeq.									X				
		More Skills	X	X							X				
		More People	X	X		X				X	X				
		More Hardware									X				
		More Data													
		More Contact													
Offut AFB, Nebraska	SAC/SGP B	Major Act.		2											
		Frequently													
		Occasional	2			2					2		2		
		Res. Adeq.													
		Res. Part Adeq.	2	2		2					2		2		
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact	2	2		2					2		2		

TABLE C-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Los Angeles Worldway Center, CA	Environmental Protection HQ SD/WE	Major Act.	X												
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People	X												
		More Hardware													
		More Data													
		More Contact													
Offut AFB, Nebraska	SAC/SGP B	Major Act.													
		Frequently													
		Occasional				2									
		Res. Adeq.				2									
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Ogden Eng. Center Clearfield, Utah	Titan II Systems Engineering TRW/DSSG	Major Act.													
		Frequently					3								
		Occasional	3			3		3							
		Res. Adeq.													
		Res. Part Adeq.	3			3		3							
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact	3			3		3							
Robins AFB, Georgia	Environmental Planning Division HQ AFRES/DCS	Major Act.													
		Frequently	3			3					3				
		Occasional		3	3		3	3	3	3		3	3		
		Res. Adeq.													
		Res. Part Adeq.											3		
		Res. Inadeq.	3	3	3	3	3	3	3	3	3	3			
		More Skills													
		More People													
		More Hardware	3	3	3	3	3	3	3	3	3	3			
		More Data		3							3	3			
		More Contact		3	3				3	3	3	3			

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Odgen Eng. Center Clearfield, Utah	Titan II Systems Engineering TRW/DSSG	Major Act.													
		Frequently					3	3							
		Occasional		3	3										
		Res. Adeq.													
		Res. Part Adeq.		3	3		3	3							
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data					3	3							
		More Contact		3	3										
Robins AFB Georgia	Environmental Planning Div. HQ AFRES/DCS	Major Act.													
		Frequently	3												
		Occasional		3	3	3	3	3							
		Res. Adeq.													
		Res. Part Adeq.				3									
		Res. Inadeq.	3	3	3										
		More Skills													
		More People													
		More Hardware	3												
		More Data	3	3	3	3									
		More Contact	3	3	3										

TABLE E-8. Current Activities and Adequacy of Resources (Continued). (Item 1.17)

Location	Group	Response	ENVIRONMENTAL IMPACT STATEMENT PREP.	FACILITY LOCATION ANALYSIS	SITE PLANNING & DESIGN	TECHNICAL TESTIMONY	HARDWARE SELECTION	HARDWARE MAINTENANCE	SOFTWARE DEVELOPMENT	SOFTWARE CONVERSION	SOFTWARE DOCUMENTATION	SOFTWARE VALIDATION	SOFTWARE MAINTENANCE	SOFTWARE DISTRIBUTION	
Wright-Patterson AFB, Ohio	Environmental Planning	Major Act.													
		Frequently													
		Occasional	5	5	5	5			5						
	Base ABW/DEEX	Res. Adeq.				5									
		Res. Part Adeq.	5	5	5				5						
		Res. Inadeq.													
		More Skills							5						
		More People													
		More Hardware							5						
		More Data							5						
		More Contact													
		Major Act.													
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

TABLE E-8. Current Activities and Adequacy of Resources (Concluded). (Item 1.17)

Location	Group	Response	ENV. DATA SURVEY	ENV. MONITORING	MAPPING	ENV. DATA COLLECT. FROM OTHER AGENCIES	DATA QUALITY CONTROL/ VERIFICATION	DATA REFORMATTING AND INTEGRATION	DATA UPDATE AND MAINTENANCE	DATA DISTRIBUTION TO AGENCIES	DATA SIMULATION MODELING	CAUSE/EFFECT ANALYSIS	DETECTION OF TRENDS	PHOTO INTERPRETATION	REMOTE SURVEY IMAGE ANALYSIS
Wright-Patterson AFB, Ohio	Environmental Planning BASE ABW/DEEX	Major Act.					5								
		Frequently						5					5		5
		Occasional	5	5		5			5	5	5	5		5	
		Res. Adeq.												5	
		Res. Part Adeq.								5					5
		Res. Inadeq.				5	5	5	5		5	5	5		
		More Skills													
		More People													
		More Hardware				5	5	5	5	5	5	5	5		5
		More Data									5	5	5		5
		More Contact													
		Major Act.													
		Frequently													
		Occasional													
		Res. Adeq.													
		Res. Part Adeq.													
		Res. Inadeq.													
		More Skills													
		More People													
		More Hardware													
		More Data													
		More Contact													

SECTION IV

RESPONSES TO QUESTIONNAIRE SECTION 2

COMPUTER SYSTEMS

1. Computer Hardware

TABLE E-9. Identification of Computer Hardware. (Item 2.7)

LOCATION	GROUP	ON - SITE SYSTEMS		TERMINALS		OFF - SITE SYSTEMS	
		ID NO	DESCRIPTION, MODES OF USE AND OFF SITE USERS	NO	TYPE	DESCRIPTION AND MODES OF USAGE	NETWORKING CAPABILITY
Tyndall AFB Florida	Aircraft Noise Analysis HQ AFESC/ DEVC	1.3	Cyber 176 - Mainframe @ Eglin				
	Computer Services HQ AFESC/ ACD	4.1	2 RJE Stations, 1 dial up 2 Tektronix 4054 Calcomp 935, 40 in. plotter			Cyber 176 Mainframe @ Eglin 256 k words and 128 k words extended	
	Env. Pro. Planning HQ AFESC/ DEVP	2.2	Mini, VAX 11/780, 128 bytes				
	Environics HQ AFESC/ RDVA	1.4 1.5 4.1	Mainframe CDC 6600 Cyber 176 @ Eglin Tektronix 4054				
	RDVA	1.4	CDC 6600			Cyber 176 Mainframe @ Eglin	
Scott AFB Illinois	Aerospace USAF ETAC	1.8 2.3	IBM 4341 Mainframe - 2 megabytes PDP 11/45 - 224 k bytes Versatec 158 plotter on DEC				
	Bio-Env. Engineering HQ MAC/SGPB	1.8	IBM 4341 Mainframe				
	Data Automation USAF ETAC	1.8 2.3	IBM 4341 - 2 Megabytes PDP 11/45 - 224 k bytes Versatec plotter on DEC				
	Env. Simualtion USAF ETAC	1.8 2.4 3.1	IBM 4341 Mainframe DEC system 10, mini HP 65, Tl 59 Versatec plotter				

TABLE E-9. Identification of Computer Hardware (Continued). (Item 2.7)

LOCATION	GROUP	ON - SITE SYSTEMS		TERMINALS		OFF - SITE SYSTEMS	
		ID NO	DESCRIPTION, MODES OF USE AND OFF SITE USERS	NO	TYPE	DESCRIPTION AND MODES OF USAGE	NETWORKING CAPABILITY
Brooks AFB Texas	Data Automation USAF OEHL	2.4 3.2	Dial mini 2 HP 1000				
	Radiation Services USAF OEHL/ RZI	3.2 3.2	HP 1000 HP 9835				
Eglin AFB Florida	Computer System Br. AD/KRESS	1.1 1.2 2.1	Cyber 176 2CDC 6600 VAX 11/780 262 k words				
Randolph AFB Texas	Env. Planning Div. HQ ATC/DEV					Burroughs 33500 3 Mather AFB	
Robins AFB Georgia	Env. Plan. Division HQ AFRES/ DCS	1.7	Mainframe - 300 rate dial up CERL operating system				
Wright-Patterson Ohio	Env. Plan Divsion BASE ABW/ DEEX	1.9	Honeywell 635 Mainframe 256 k words				

2. Software Development

TABLE E-10. Software Development Modes. (Items 2.11, 2.12)

LOCATION	GROUP	LANGUAGE USED 2.11: FORTRAN IV	FORTRAN V	OTHER FORTRAN	BASIC	COBOL	ASSEMBLER	ALGOL	2.12.1: NO. OF FULL TIME EQUIV. INVOLVED	DEVELOPMENT AREAS	2.12.7 REASON FOR DEVE: CAPABILITY NOT AVAIL. ELSEWHERE	EASIER AND CHEAPER TO SELF DEVELOP	CAPABILITY NOT ON HARDWARE	2.12.5: PROVIDE PROGS. FOR OUTSIDE USE	GROUPS ACCESSIBLE TO PROGRAMS	WOULD MAKE PROGS. AVAILABLE FOR OUTSIDE USE	PROVIDE MAINT.	PROVIDE DOCUMENTATION
Tyndall AFB, FL	Aircraft Noise Analysis HQ AFESC/DEVC	X								Aircraft noise demographic	X			YES	DOD and USAF agencies		YES	
	Computer Ser. HQ AFESC/ACD	X								None					State, federal local govt, univ.	YES	YES	
	Env. Pro. Plan. HQ AFESC/DEVP	X								Social, economic	X	X	X	YES	Air Force users, contractors, Army	YES	YES	YES
	Environic HQ AFESC/RDVA	X	X		X				5	Chemical spills, evaporation fuel droplet evaporation and free fall	X				DTIC, NTIS, TANNAF	YES	YES	YES
	Env. Pro. Ass. HQ AFESC/DEVN	X								None					USAF Bases	YES	YES	
	Nat. Res. Div. HQ AFESC/DEVN					X												
	RDVA	X	X		X				1	Ambient air Qual. modelling, wind energy airport/air quality modeling	X				Occupation and environmental health labs	YES	YES	YES

TABLE E-10. Software Development Modes (Continued). (Items 2.11, 2.12)

LOCATION	GROUP	LANGUAGE USED 2.11: FORTRAN IV	FORTRAN V	OTHER FORTRAN	BASIC	COBOL	ASSEMBLER	ALGOL	2.12.1: NO. OF FULL TIME EQUIV. INVOLVED	DEVELOPMENT AREAS	2.12.7 REASON FOR DEVE: CAPABILITY NOT AVAIL. ESLEWHERE	EASIER AND CHEAPER TO SELF DEVELOP	CAPABILITY NOT ON HARDWARE	2.12.5: PROVIDE PROGS. FOR OUTSIDE USE	GROUPS ACCESSIBLE TO PROGRAMS	WOULD MAKE PROGS. AVAILABLE FOR OUTSIDE USE	PROVIDE MAINT.	PROVIDE DOCUMENTATION
Scott AFB Illinois	Aerospace Sciences USAF ETAC	X							1	Meteorolgical probability forecasts	X					YES	YES	NO
	Bio-Env. Eng. HQ MAC/XGPE	X																
	Data Automation USAF ETAC	X					X		12	Climatized data for air applications					USAF, DOD and all govt. agencies served by weather services.	YES	YES	NO
	Env. Simulation USAF ETAC	X					X		3	Meteorology	X	X				YES	NO	YES
	ETAC USAF ETAC			X					2	Stat. analysis, air pollution, atmosphere	X			YES	ETAC, DOD, USAF agencies	YES	YES	YES
Brooks AFB Texas	Data Automation USAF OEHL	X			X		X		3	Comp. AFNTPR	X			NO		YES		
	Health Branch USAF OEHL/ECO	X								IND. Hygiene water, air, chemical spills etc.					In-house groups	YES	YES	YES
	Radiation Services USAF OEHL/RZI	X			X					Non-ionizing radiation	X	X			Radiation eval. and measurements branch		NO	NO

TABLE E-10. Software Development Modes (Concluded) (Items 2.11, 2.12)

		LANGUAGE USED 2.11							2.12.1		2.12.7 REASON FOR DEVE			2.12.5				
LOCATION	GROUP	FORTRAN IV	FORTRAN V	OTHER FORTRAN	BASIC	COBOL	ASSEMBLER	ALGOL	NO. OF FULL TIME EQUIV. INVOLVED	DEVELOPMENT AREAS	CAPABILITY NOT AVAIL. ELSEWHERE	EASIER & CHEAPER TO SELF DEVELOP	CAPABILITY NOT ON HARDWARE	PROVIDE PROGS. FOR OUTSIDE USE	GROUPS ACCESSIBLE TO PROGRAMS	WOULD MAKE PROGS. AVAILABLE FOR OUTSIDE USE	PROVIDE MAINT.	PROVIDE DOCUMENTATION
Eglin AFB Florida	Computer Sys. Br. AD/KRESS	X	X							Environmental readings database	X			NO		NO	NO	YES
Wright-Patterson AFB Ohio	Env. Plan. Division BASE ABW/DEEX			X					2	Water pollution control management hazardous waste inventory analysis	X	X			AFLC installation	YES		

3. Computer System Elements Most Important to Models

2.13 Elements of Computer Systems Considered Most Effective for Environmental Modeling Applications

Most IMP (90% - 100%)

Available of interactive terminals

Database and data manipulations

Very IMP (70% - 90%)

Adequate response time

Adequate operating system

Adequate memory and disk capacity

Adequate environmental programs

Adequate documentation

Ability to solve large problems

Graphic applications

Program development

Liaison between users and computer staff

IMP (50% - 70%)

Networking

Perform small computer problem

Education

Text editing

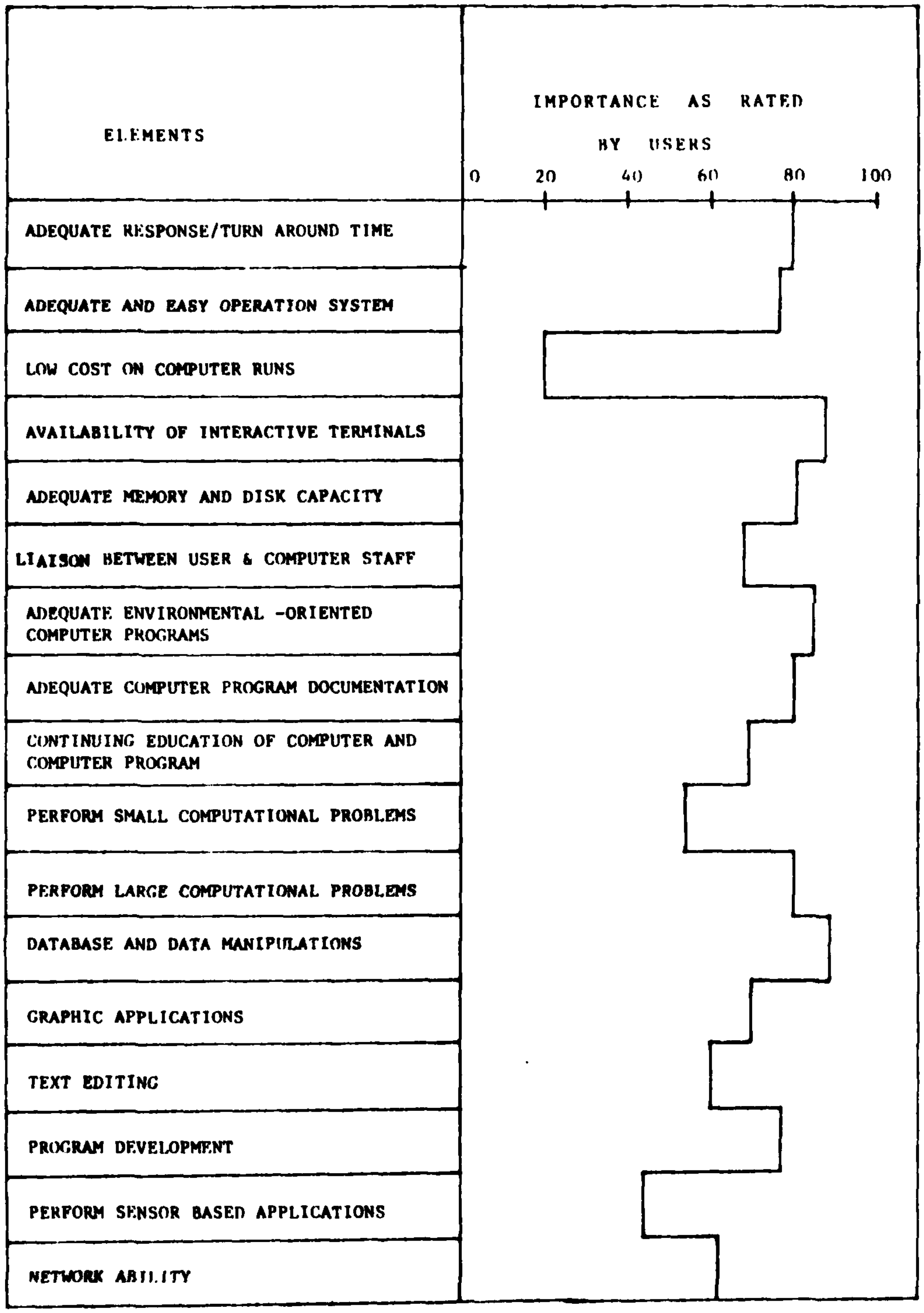
REL UNIMP (50%)

Low cost runs

Sensor based applications

2.13 (Detail) See Figure

TABLE E-11. Summary of Preference for Elements of Computer Systems. (Item 2.13)



4. Software Development Evaluation

TABLE E-12. Environmental Program Development Assessment by Location. (Item 2.14)

LOCATION	APPLICATION	SOFTWARE DEVELOPMENT FUNCTIONS													COMMITMENT			Rank Key: **** Fully Dev. & Oper. *** Mostly Dev. ** Partly Dev. * Not Dev.
		COMPUTER OPERATIONS	SOFTWARE DOCUMENTATION	INFORMATION ON OUTSIDE SOFTWARE	TRAINING FOR USE OF COMPUTER & SOFTWARE	PROVIDE HARDWARE, SOFTWARE SUPPORT TO USER	LIAISON WITH USER GROUP	CATALOG APPLICATION SOFTWARE	PROCURE APPLICATION SOFTWARE	PROVIDE DEVELOPMENT STANDARDS	DEVELOP APPLICATION SOFTWARE	SOFTWARE TESTING	SOFTWARE MAINTENANCE	REVIEW AND RECOMMEND METHODOLOGY	WILLING TO DISTRIBUTE	WILLING TO MAINTAIN	WILLING TO DOCUMENT	RANK
Scott AFB, IL	Aerospace Sciences USAF ETAC	X			X						X	X	X		YES	NO	YES	**
	Automation Branch USAF ETAC	X	X	X	X	X	X	X		X	X	X	X	X	YES	NO	NO	****
	Bio-Env. Oper. HQ MAC/XGPN	X			X		X	X	X	X		X		X	YES	NO	NO	***
Brooks AFB, TX	Data Automation USAF OEHL	X	X		X	X	X		X		X				NO	NO	NO	**
	Health Branch USAF OEHL/ECO	X	X		X	X	X			X	X	X	X	X	YES	YES	YES	***
	Radiation Ser. USAF OEHL/RZI	X													YES	NO	NO	*
Eglin AFB, FL	Computer Sys. Branch AD/KRESS	X	X	X	X	X	X	X	X	X	X	X	X	X	NO	NO	YES	****
Robins AFB, GA	Env. Planning Division HQ AFRES/DCS				X		X							X	YES	NO	NO	*

TABLE E-13. Software Development Functions. (Item 2.14)

LOCATION	GROUP	EVALUATION	RANK	PERFORMS COMPUTER OPERATION FUNCTIONS	PROVIDES SOFTWARE INFO. FOR APPLICATION PROGRAMS	PROVIDES INFORMATION ON OUTSIDE PROGRAMS	TRAINING FOR UTILIZATION OF COMPUTER SYS. & SOFT.	PROVIDES SOFTWARE, HARDWARE AND SUPPORT TO USER	LIASON WITH USER GROUPS	CATALOGS AND RATES APPLICATION SOFTWARE	PROCURES APPLICATION SOFTWARE	PROVIDES DEVELOPMENT STANDARDS	DEVELOPS APPLICATION SOFTWARE	PROVIDES SOFTWARE TESTING	PROVIDES SOFTWARE MAINTENANCE	REVIEWS AND RECOMMENDS METHODOLOGY
Tyndall AFB Florida	Aircraft Noise Ana. HQ AFESC/DEVC	Not Performed.														
		Sometimes Perf.	****													
		Regularly Perf.		X	X	X	X	X	X	X	X	X	X	X	X	X
	Computer Serv. Branch HQ AFESC/ACD	Not Performed.			X		X	X	X	X						X
		Sometimes Perf.	**				X						X			X
		Regularly Perf.		X	X							X		X	X	
	Env. Protect. Planning HQ AFESC/DEVP	Not Performed.							X	X			X	X	X	
		Sometimes Perf.	**		X	X	X					X				X
		Regularly Perf.		X				X			X					
	Env. Protect. & Assess. Div. HQ AFESC/DEVP	Not Performed.			X				X			X		X		
		Sometimes Perf.	**	X												
		Regularly Perf.				X	X	X			X	X		X		X
	Natural Res. Div. HQ AFESC/DEVN	Not Performed.		X	X	X	X	X		X	X	X	X		X	
		Sometimes Perf.	*						X					X		X
		Regularly Perf.														
	F.D.V.A.	Not Performed.				X	X	X		X		X				
		Sometimes Perf.	**	X	X				X		X				X	X
		Regularly Perf.											X	X		
Scott AFB	Aerospace HQ AWS/DNXP	Not Performed.		X		X	X	X				X	X		X	X
		Sometimes Perf.	*		X				X	X	X			X		
		Regularly Perf.														

TABLE E-13. Software Development Functions (Continued). (Item 2.14)

LOCATION	GROUP	EVALUATION	RANK	PERFORMS COMPUTER OPERATION FUNCTIONS	PROVIDES SOFTWARE INFO. FOR APPLICATION PROGRAMS	PROVIDES INFORMATION ON OUTSIDE PROGRAMS	TRAINING FOR UTILIZATION OF COMPUTER SYS. & SOFT.	PROVIDES SOFTWARE, HARDWARE & SUPPORT TO USER	LIASON WITH USER GROUPS	CATALOGS AND RATES APPLICATION SOFTWARE	PROCURES APPLICATION SOFTWARE	PROVIDES DEVELOPMENT STANDARDS	DEVELOPS APPLICATION SOFTWARE	PROVIDES SOFTWARE TESTING	PROVIDES SOFTWARE MAINTENANCE	REVIEWS AND RECOMMENDS METHODOLOGY
Scott AFB Illinois	Bio-Env. Engineering HQ MAC/XGPE	Not Performed.			X	X		X					X		X	
		Sometimes Perf.	*				X		X	X	X	X				X
		Regularly Perf.														
	Environmental Simulation USAF ETAC	Not Performed.			X	X	X		X	X	X	X			X	
		Sometimes Perf.	*													X
		Regularly Perf.		X									X	X		
	ETAC USAF ETAC	Not Performed.						X								
		Sometimes Perf.	***			X		X		X						
		Regularly Perf.		X	X		X			X		X	X	X	X	X
Brooks AFB Texas	Data Automation USAF OEHL	Not Performed.				X				X		X		X	X	X
		Sometimes Perf.	**				X				X		X			
		Regularly Perf.		X	X			X	X							
	Health Branch USAF OEHL/ECO	Not Performed.				X				X	X					
		Sometimes Perf.	**		X		X		X				X			
		Regularly Perf.		X				X				X		X	X	X
Eglin AFB Florida	Computer Sys. Branch AD/DRESS	Not Performed.								X				X		
		Sometimes Perf.	****						X		X		X		X	X
		Regularly Perf.		X	X	X	X	X	X	X	X	X	X	X	X	X
Robins AFB Georgia	Envir. Plan. Div. HQ AFRES/DCS	Not Performed.		X	X	X				X	X	X	X	X	X	
		Sometimes Perf.	*				X									X
		Regularly Perf.							X							

TABLE E-13. Software Development Functions (Concluded) . (Item 2.14)

LOCATION	GROUP	EVALUATION	RANK	PERFORMS COMPUTER OPERATION FUNCTIONS	PROVIDES SOFTWARE INFO. FOR APPLICATION PROGRAMS	PROVIDES INFORMATION ON OUTSIDE PROGRAMS	TRAINING FOR UTILIZATION OF COMPUTER SYS. & SOFT.	PROVIDES SOFTWARE, HARDWARE & SUPPORT TO USER	LIASON WITH USER GROUPS	CATALOGS AND RATES APPLICATION SOFTWARE	PROCURES APPLICATION SOFTWARE	PROVIDES DEVELOPMENT STANDARDS	DEVELOPS APPLICATION SOFTWARE	PROVIDES SOFTWARE TESTING	PROVIDES SOFTWARE MAINTENANCE	REVIEWS AND RECOMMENDS METHODOLOGY
Wright-Patterson AFB, Ohio	Env. Plan. Div. BASE ABW/DEEX	Not Performed.								X	X					
		Sometimes Perf.	***			X	X	X				X		X	X	X
		Regularly Perf.		X	X				X			X		X		
		Not Performed.														
		Sometimes Perf.														
		Regularly Perf.														
		Not Performed.														
		Sometimes Perf.														
		Regularly Perf.														
		Not Performed.														
		Sometimes Perf.														
		Regularly Perf.														
		Not Performed.														
		Sometimes Perf.														
		Regularly Perf.														
		Not Performed.														
		Sometimes Perf.														
		Regularly Perf.														
		Not Performed.														
		Sometimes Perf.														
		Regularly Perf.														

5. General Computer Activities

TABLE E-14. General Computer Activities. (Item 2.15)

LOCATION	GROUP	ACTIVITY	MACHINE READABLE DATABASE	ENVIR. MODELING SOFTWARE	IMAGE ANALYSIS SOFTWARE	GEOGRAPHIC INFO. SYSTEM	STATISTICAL ANALYSIS	RANK KEY **** FULLY DEV. & OPERAT. *** MOSTLY DEV. ** PARTLY DEV. * NOT DEV.
Tyndall AFB	Aircraft Noise Analysis HQ AFESC/DEVC	Develop		X	X			
		Maintain	X	X	X			**
		Distribute	X	X	X			
		Use	X	X	X			
	Computer Services HQ AFESC/ADC	Develop						
		Maintain		X				*
		Distribute		X				
		Use	X		X		X	
	Environics HQ AFESC/RDVA	Develop	X	X		X	X	
		Maintain		X				***
		Distribute	X	X			X	
		Use	X	X	X	X	X	
	Natural Resources Division HQ AFESC/DEVN	Develop						
		Maintain	X					*
		Distribute	X				X	
		Use	X				X	
	Protection & Assessment (DEVP) HQ AFESC/DEVP	Develop						
		Maintain						
		Distribute.	X	X	X	X	X	**
		Use	X	X	X	X	X	
	R.D.V.A.	Develop	X	X				
		Maintain		X				**
		Distribute	X	X		X		
		Use	X	X	X	X	X	

TABLE E-14. General Computer Activities (Continued). (Item 2.15)

LOCATION	GROUP	ACTIVITY	MACHINE READABLE DATABASE	ENVIR. MODELING SOFTWARE	IMAGE ANALYSIS SOFTWARE	GEOGRAPHIC INFO. SYSTEM	STATISTICAL ANALYSIS	
Scott AFB Illinois	Aerospace Sciences USAF ETAC	Develop		X			X	
		Maintain						
		Distribute						*
		Use	X				X	
	Bio-Env. Engineering HQ MAC/CCPE	Develop						
		Maintain		X			X	
		Distribute						*
		Use	X	X			X	
	Data Automation USAF ETAC	Develop	X	X				
		Maintain	X					
		Distribute	X	X				**
		Use	X			X	X	
	Env. Simulation USAF ETAC	Develop		X			X	
		Maintain						
		Distribute		X			X	*
		Use	X	X			X	
	USAF ETAC	Develop	X	X	X	X	X	
		Maintain	X	X	X	X	X	
		Distribute	X	X	X	X	X	
		Use	X					***
Brooks AFB Texas	Health Branch USAF OEHL/ECO	Develop						
		Maintain						
		Distribute						
		Use	X					

TABLE E-14. General Computer Activities (Concluded). (Item 2.15)

LOCATION	GROUP	ACTIVITY	MACHINE READABLE DATABASE	ENVIR. MODELING SOFTWARE	IMAGE ANALYSIS SOFTWARE	GEOGRAPHIC INFO. SYSTEM	STATISTICAL ANALYSIS	
Eglin AFB Florida	Computer Systems Branch AD/KRESS	Develop	X	X	X		X	
		Maintain	X	X	X		X	**
		Distribute	X					
		Use	X					
Randolph AFB Texas	ARIM/Community Planning HQ ATC/DEV	Develop						
		Maintain	X					*
		Distribute	X			X		
		Use						
	Envir. Planning Division HQ ATC/DEV	Develop	X	X				
		Maintain		X	X		X	*
		Distribute						
		Use						
Robins AFB Georgia	Envir. Planning HQ AFRES/DCS	Develop						
		Maintain						
		Distribute						*
		Use	X	X		X	X	
Wright-Patterson AFB, Ohio	Envir. Planning BASE ABW/DEEX	Develop	X				X	
		Maintain						
		Distribute						*
		Use	X	X				
		Develop						
		Maintain						
		Distribute						
		Use						

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SECTION V
RESPONSES TO QUESTIONNAIRE SECTION 3
Environmental Science and Planning

1. Environmental Groups and Missions

TABLE E-15. Environmental Science and Planning Functions.-(Item 3.7)

LOCATION	GROUP	FUNCTION	FREQUENCY	PRELIM. ENG. DATA	FIELD SURVEY	MANUAL DATA INTER.	AUTO. DATA INTER.	COLLECTION OF DATA	CHANGE DETECTION/TREND ANA.	NEED ANA. FOR AF FACILITY	LOCATION ANA. OF AF FACILITY	AIRPORT OPER. DATA COLLECTION	ECONOMIC & FOREC. DATA COL.	USGS TOPO. MAP	AERIAL PHOTOGRAPHY	HIGHWAY MAPPING	LAND USE PLANNING	ZONING MAP USAGE	CENSUS DATA USAGE	SPECIAL ORDINANCE INTER.	PARKS, OPEN SPACE MAP USAGE	HISTORIC RESOURCE DATA	PUBLIC FAC. DATA COLLECTION	PROPERTY TAX ASSESSMENT
Tyndall AFB, FL	BASH HQ AFESC/DEVW	Bird strike (collision) avoidance	A lot						4			4					4							
			Some		4	4	4	4					4						4					
			Little								4			4				4						
	Bio-Env. Engineering SHIH	Support hospital industrial hygiene. Air and water pollution.	A lot																					
			Some		7	7		7				7												
			Little				7							7	7				7				7	
	Env. Plan. HQ AFESC/DEV	Technical assistance in env. community planning.	A lot										32						32					
			Some	32		32	32																	
			Little						32	32	32			32			32						32	32
	HQ AFESC/DEVP	Technical assistance for Air Force env. programs.	A lot	9	9	9		9											9					
			Some							9				9	9	9	9	9		9			9	
			Little				9														9	9		9
	Env. Science HQ AFESC/RDVC	Determine env. fate of Air Force fuels, lubricants, etc. as employed in normal oper.	A lot																					
			Some																					
			Little		10			10	10			10										10		
Scott AFB, IL	Aerospace HQ AMS/DMP	Identify future requirements.	A lot																					
			Some				3																	
			Little	3		3			3	3	3		3	3								3		
	Bio-Env. HQ MAC/RGPS	Monitoring air/water quality pollution. Hazardous waste sampling.	A lot			5	5	5				5												
			Some						5	5	5													
			Little																	5				
	Env. Plan. DCS/CIVIL	Provide environmental policy and procedures.	A lot					3			3													
			Some		3	3						3		3			3					3		
			Little	3			3		3				3			3		3	3	3			3	3

TABLE E-15. Environmental Science and Planning Functions (Continued). (Item 3.7)

LOCATION	GROUP	FUNCTION	FREQUENCY	SOILS MAP USAGE	GEOLOGY AND WATER TABLE	DRAINAGE MAP USAGE	WILDLIFE RANGE MAP USAGE	ENDANGERED SPECIES LIST USAGE	FLOOD PLAIN MAP USAGE	CZ MAPPING & WETLAND	WATER QUALITY CLASS LISTING	METEOR. DATA COLLECTION	AIR QUALITY DATA COLLECTION	ENERGY RATE CONSUMPTION ANA.	PRELIM. SIT DESIGN	DETAIL SITE DESIGN	PREPARATION OF ENV. IMPACT STATEMENT	PREPAR. OF REG. REPORTS	TESTIMONY AT HEARINGS	SUPERVISION OF CONSTRUCTION	POST CONSTRUCTION MONITORING
Tyndall AFB, FL	BASH HQ AFESC/DEVN	Bird strike (collusion) avoidance	A lot												4						
			Some			4	4														
			Little	4	4			4	4	4				4		4					
	Bio-Env. Engineering SHIH	Support hospital industrial hygiene. Air and water pollution.	A lot																		
			Some																		
			Little			7				7					7	7	7	7			
	Env. Plan. HQ AFESC/DEV	Technical assistance in env. community planning.	A lot														32				
			Some					32										32			
			Little	32											32	32			32		
	HQ AFESC/DEVP	Technical assistance for Air Force env. programs.	A lot	3	3	3					3		3				3	3			
			Some						3	3		3			3				3		3
			Little																		
	Env. Sci. HQ AFESC/RDVC	Determine env. fate of Air Force fuels, lubricants, etc. as employed in normal operations.	A lot																		
			Some																		
			Little														10	10	10		
Scott AFB, IL	Aerospace HQ AMS CMP	Identify future requirements.	A lot																		
			Some									1									
			Little											3	3						
	Bio-Env. HQ MAC/RGPB	Monitoring air/water quality pollution. Hazardous waste sampling.	A lot									5	5								
			Some												5		5	5			5
			Little																5		
	Env. Plan. DCS/CIVIL	Provide environmental policy and procedures.	A lot											3	3		3				
			Some					3													
			Little	3	3	3			3	3	3	3				3		3			

TABLE E-15. Environmental Science and Planning Functions (Continued). (Item 3.7)

LOCATION	GROUP	FUNCTION	FREQUENCY	SOILS MAP USAGE	GEOLOGY AND WATER TABLE	DRAINAGE MAP USAGE	WILDLIFE RANGE MAP USAGE	ENDANGERED SPECIES LIST USAGE	FLOOD PLAIN MAP USAGE	CZ MAPPING & WETLAND	WATER QUALITY CLASS LISTING	METEOR. DATA COLLECTION	AIR QUALITY DATA COLLECTION	ENERGY RATE CONSUMPTION ANA.	PRELIM. SITE DESIGN	DETAIL SITE DESIGN	PREPARATION OF ENV. IMPACT STATEMENT	PREPAR. OF REG. REPORTS	TESTIMONY AT HEARINGS	SUPERVISION OF CONSTRUCTION	POST CONSTRUCTION MONITORING
Brooks AFB, IL	USAF OEHL/ ECA	Assist bases on air quality problems.	A lot										5								
			Some																		5
			Little									5						5			
	Env. Assess. USAF OEHL/ ECE	Deal with environmental problems caused by aircraft.	A lot									10	10								
			Some																10		
			Little											10	10		10	10			
	Rad. Ser. USAF OEHL/ RZI	Field support of radiation protection.	A lot																		
			Some																		
			Little																		
	Water Qual. USAF OEHL/ ECM	Water discharge studies, extent of waste disposal.	A lot		5						5										
			Some	5		5		5									5				5
			Little						5			5		5	5						
Eglin AFB, FL	Bio-Env. Engineering BASE SGPE	Env. surveillance of activities through collection and analysis.	A lot								6				6	6					
			Some		6							6	6				5				
			Little			6	6	6	[illegible]									5			
	Env. Pro. AD/DEEVE	Advise base organizations on laws and regulations.	A lot			4	4	4	4				4		4	4	4	4			
			Some	4	4					4	4	4							4		4
			Little																		
Randolph AFB, TX	Bio-Env. Engineering BASE SGPM	Monitoring health aspects of env. protection and industrial operations. Liaison between DOD and Congress.	A lot																		
			Some								14		14		14	14					
			Little		14	14											14				
	Env. Plan. HQ ATC/DEV	Assist base on environmental matters.	A lot								18						18	13			13
			Some			18			19				18								
			Little	13	18		13	18		13		18		19	18	13			19	13	

TABLE E-15. Environmental Science and Planning Functions (Continued). (Item 3.7)

LOCATION	GROUP	FUNCTION	FREQUENCY	PRELIM. ENG. DATA	FIELD SURVEY	MANUAL DATA INTER.	AUTO. DATA INTER.	COLLECTION OF DATA	CHANGE DETECTION/TREND ANA.	NEED ANA. FOR AF FACILITY	LOCATION ANA. OF AF FACILITY	AIRPORT OPER. DATA COLLECTION	ECONOMIC & FOREC. DATA COL.	USGS TOPO. MAP	AERIAL PHOTOGRAPHY	HIGHWAY MAPPING	LAND USE PLANNING	ZONING MAP USAGE	CENSUS DATA USAGE	SPECIAL ORDINANCE INTER.	PARKS, OPEN SPACE MAP USAGE	HISTORIC RESOURCE DATA	PUBLIC FAC. DATA COLLECTION	PROPERTY TAX ASSESSMENT
Brooks AFB, IL	USAF OEHL/ ECA	Assist bases on air quality problems.	A lot	5	5	5		5																
			Some																					
			Little								5													
	Env. Assess. USAF OEHL/ ECE	Deal with environmental problems caused by aircraft.	A lot									10												
			Some	10	10	10	10			10														
			Little					10	10					10		10	10	10	10	10				
	Rad. Ser. USAF OEHL/ RZI	Field support of radiation protection.	A lot	3	3																			
			Some			3	3																	
			Little					3	3															
	Water Qual. USAF OEHL/ ECM	Water discharge studies, extent of waste disposal.	A lot	5	5	5		5				5		5	5					5				
			Some																				5	
			Little				5		5		5						5							
Eglin AFB, FL	Bio-Env. Engineering BASE SGPE	Env. surveillance of activities through collection and analysis.	A lot		6	6		6	6															
			Some	5																				
			Little																					
	Env. Pro. AD/DEEVE	Advise base organizations on laws and regulations.	A lot		4	4		4						4			4					4		
			Some				4						4		4			4			4		4	
			Little						4			4							4	4				
Randolph AFB, TX	Bio-Env. Engineering BASE SGPM	Monitoring health aspects of env. protect. and industrial operations. Liaison between DOD and Congress.	A lot																					
			Some			14			14															
			Little	14	14												14							
	Env. Plan. HQ ATC/DEV	Assist base on environmental matters.	A lot			18						18					13	18		18				
			Some	18						18	13		13						13		13	13	13	
			Little		18		13							13	13	13								13

TABLE E-15. Environmental Science and Planning Functions (Continued). (Item 3.7)

LOCATION	GROUP	FUNCTION	FREQUENCY	PRELIM. ENG. DATA	FIELD SURVEY	MANUAL DATA INTER.	AUTO. DATA INTER.	COLLECTION OF DATA	CHANGE DETECTION/TREND ANA.	NEED ANA. FOR AF FACILITY	LOCATION ANA. OF AF FACILITY	AIRPORT OPER. DATA COLLECTION	ECONOMIC & FORC. DATA COL.	USGS TOPO. MAP	AERIAL PHOTOGRAPHY	HIGHWAY MAPPING	LAND USE PLANNING	ZONING MAP USAGE	CENSUS DATA USAGE	SPECIAL ORDIANCE INTER.	PARKS, OPEN SPACE MAP USAGE	HISTORIC RESOURCE DATA	PUBLIC FAC. DATA COLLECTION	PROPERTY TAX ASSESSMENT
Kelly AFB, TX	BASE AFB/ DEPD	Environmental planning and management of Kelly AFB.	A lot																					
			Some																				1	
			Little											1	1									
Los Angeles Worldway Center, CA	Env. Pro. Committee HQ SD/WE		A lot		X																			
			Some	X		X	X	X									X					X		
			Little						X	X	X		X			X		X	X	X			X	
Offut AFB, NE	SAC/SGPB	Management of environmental and occupational health programs in SAC.	A lot																					
			Some			2	2	2																
			Little		2				2								2	2						
Ogden Eng. Center, Clearfield UT	Titan II Sys. Eng. TRW/DSSG	Evaluate and develop modifications to enhance system preformance and maintenance.	A lot																					
			Some	3	3	3	3	3																
			Little																					
Robin AFB, GA	Env. Plan. Div. HQ AFRES/DCS	Comprehensive env. planning, coordination and management for all AFRES bases.	A lot																					
			Some	3	3	3	3			3		3												
			Little					3	3		3		3	3			3	3	3	3	3	3	3	
Vandenberg AFB, CA	AFSC Missle Safety WSMC/SEM	Range safety, system safety, Personnel/Public safety.	A lot	X						X	X													
			Some																					
			Little		X	X	X																	
Wright-Patterson AFB, OH	Env. Plan. BASE ABW/ DEEX	Manage and administer the env. natural resources, community planning, and energy conservation programs.	A lot	5	5			5	5								5				5			
			Some			5	5							5	5	5		5	5					
			Little							5	5	5	5							5		5	5	

TABLE E-15. Environmental Science and Planning Functions (Concluded). (Item 3.7)

LOCATION	GROUP	FUNCTION	FREQUENCY	SOILS MAP USAGE	GEOLOGY AND WATER TABLE	DRAINAGE MAP USAGE	WILDLIFE RANGE MAP USAGE	ENDANGERED SPECIES LIST USAGE	FLOOD PLAIN MAP USAGE	CZ MAPPING & WETLAND	WATER QUALITY CLASS LISTING	METEOR. DATA COLLECTION	AIR QUALITY DATA COLLECTION	ENERGY RATE CONSUMPTION ANA.	PRELIM. SIT DESIGN	DETAIL SITE DESIGN	PREPARATION OF ENV. IMPACT STATEMENT	PREPAR. OF REG. REPORTS	TESTIMONY AT HEARINGS	SUPERVISION OF CONSTRUCTION	POST CONSTRUCTION MONITORING
Kelly AFB, TX	BASE AFB/ DEPD	Environmental planning and management of Kelly AFB.	A lot								1							1			
			Some		1	1			1				1						1		
			Little					1							1						
Los Angeles Worldway Center, CA	Env. Prot. Committee HQ SD/WE		A lot									X	X				X				
			Some					X	X	X	X			X				X	X		
			Little	X	X	X	X								X	X					X
Offut AFB, NE	SAC/SGPB	Management of environmental and occupational health programs in SAC.	A lot																		
			Some								2										
			Little		2							2	2		2	2	2	2			2
Ogden Eng. Center, Clearfield UT	Titan II Sys. Eng. TRW/DSSG	Evaluate and develop modifications to enhance system preformance and mainte ance.	A lot																		
			Some									3									
			Little																		
Robin AFB, GA	Env. Plan. Div. HQ AFRES/DCS	Comprehensive env. planning, coordination and management for all AFRES bases.	A lot																		
			Some														3	3			
			Little		3	3	3	3	3	3	3	3	3								
Vandenberg AFB, CA	AFSC Missle Safety WSMC/SEM	Range safety, system safety, Personnel/Public safety.	A lot											X	X						X
			Some					X													
			Little						X			X	X				X		X		
Wright-Patterson AFB, OH	Env. Plan. BASE ABW/ DEEX	Manage and administer the env. natural resources, community planning, and energy conservation programs.	A lot			5						5	5	5							
			Some		5			5	5						5		5	5			
			Little	5			5				5					5			5		

2. Data Availability and Maintenance

TABLE E-16. Data Availability and Maintenance. (Item 3.9)

LOCATION	GROUP	SOURCES OF DATA	DATABASES AND MAINTENANCE
Tyndall AFB Florida	Aircraft Sys. HQ AFESC/DEVC	Field data.	
	BASH Team HQ AFESC/DEVN	Individual base reports, field data	AFESC maintained.
	Bio-Env. BASE SGPM	Field Survey	
	Community Plan. HQ AFESC/DEV	In-house	Range planning data, AFESC, RDVA.
	Dir. of Env. Plan. HQ AFESC/DEV	Field data and databases	Storet, ETIS, EPA, CERL, Tract data, Bureau of Census
	Env. Sciences HQ AFESC/RDVC	Literature searches	
	Meteorology HQ AFESC/WE	ETAC	AOAM stability, hourly MET. data ETAC.
	Nat. Res. Div. DEVN	Other sources.	Soil information. US Army, CERL
	RDVA	Field Surveys, contractors	
	Env. Planning HQ AFESC/DEV	Database, MAJCOM TAC	EPA, federal, state, agencies.
Scott AFB Illinois	Aerospace HQ AFESC/DEV	ETAC	USAFETAC
	Bio-Env. HQ AWS/DNXP	In-house data - ETAC	DATSAVE - ETAC
	Env. Planning DCS/CIVIL	A/E firms, federal agencies	CERL, DIDS
	Env. Simulation USAF ETAC	USAFETAC, databases	DATSAVE, 3DNEPM, MPS - ETAC
Brooks AFB Texas	Air Qual. USAF OEHL/ECA	Surveys, ETAC, Ashville weather	Ashville weather
	Environmental Assessment USAF OEHL/ECE	Field monitoring, data, EPA	SAROAD, EPA, NEDS, - EPA

TABLE E-16. Data Availability and Maintenance (Continued). (Item 3.9)

LOCATION	GROUP	SOURCES OF DATA	DATABASES AND MAINTENANCE
Brooks AFB Texas	Env. Chem. Br. USAF OEHL/SAN	Field data and surveys	
	Radiation Serv. USAF OH/RZN	Field data and surveys	ETAC, IRAC file
	Water Qa. USAF OEHL/ECW	Field data	NAWDEX - USGS
Eglin AFB Florida	Bio-Env. BASE SGPE	Field data, USAF agencies	
	Env. Protect. AD/DEEVE	Field data, databases, etc.	USAF, OEHL, AOAM, ETIS
Randolph AFB Texas	Aeromedical USAF SGPM	Field sampling	Noise handbooks, USAF agencies
	Env. Planning HQ ATC/DEV	Federal, State, Local agencies, EPA, CEQ	
Hanscomb AFB Mass	Middle Atmos. Tech. AFGL	Field data, databases	AFGWC, world data center
Kelly AFB Texas	Environmental BASE AFB/LEPD	SGB and CD	
Los Angeles Worldway Center, CA	Envir. Protect. Committee HQ SD/WE	Field data, USAFETAC.	Climatology - USAFETAC Modelling - Marshall Space Flight Center
Offut AFB Nebraska	SAC/SGPB	Field data, USAFOEHL	USAFOEHL
Robins AFB Georgia	Env. Plan. Div. HQ AFRES/LCS	Field data, CERL, database, local planning	
Wright-Patterson AFB, Ohio	Env. Plan. Sec. BASE ABW/LEEX	Field data, EPA reports	ETIS

3. Databases Used

TABLE E-17. Databases Used. (Item 3.9)

LOCATION	GROUP	ITEM	DESCRIPTION
Tyndall AFB Florida	BASH HQ AFESC/DEVN	1. Source of Data	1. Individual base reports and field data
		2. Databases in Use	2. Bird strike mishap reports AFISC
		3. Knowledge of data sources	3. Hawk migration Assoc. of N. America, individual databases
		4. Shared data	4. FAA DOD agencies
		5. Data Collection	5. BASH Team
		6. Data Standardization/ Coordination	
		7. Usefulness of Data Network	7. ICAO system implementation successful
	Bio-Env. Engineer BASE SGPM	1. Source of Data	1. Field surveys
		2. Databases in Use	
		3. Knowledge of data sources	
		4. Shared data	4. OEHL
		5. Data Collection	5. Shop folders, standard forms
		6. Data Standardization/ Coordination	
		7. Usefulness of Data Network	
	Community Planning HQ AFESC/DEV	1. Source of Data	1. In-house
		2. Databases in Use	2. Range planning data (AESC/RDVA)
		3. Knowledge of data sources	3.
		4. Shared data	4. Range using commands and units
		5. Data Collection	
		6. Data Standardization/ Coordination	
		7. Usefulness of Data Network	

TABLE E-17. Databases Used (Continued). (Item 5.9)

LOCATION	GROUP	ITEM	DESCRIPTION
Tyndall AFB Florida	Dir. of Env. Planning HQ AFESC/ DEV	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Field data, databases 2. Storet, EPA, CERL, ETIS, Tract data, Bureau of Census 3. Landsat, Bureau of Census, State data banks 4. Major commands USAF bases
	Env. Sciences HQ AFESC/ RDVC	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Literature searches 2. DIALOG - *Lockheed Information systems*
	Meteorology HQ AFESC/WE	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. ETAC 2. AQAM, ETAC 3. 4. AFESC

TABLE E-17. Databases Used (Continued). (Item 3.9)

LOCATION	GROUP	ITEM	DESCRIPTION
Scott AFB Illinois	Aerospace HQ AWS/DNXP	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. ETAC 2. USAFETAC 3. MIT, upper air database
	Envir. Planning DCS/CIVIL	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. A/E firms, federal agencies 2. CERL 3. DIDS
	Envir. Simulation USAF ETAC	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. USAF ETAC, database 2. DATSAVE.3DNEPH MPS - USAFETAC 3. E/O Tower data, Nato Opaque

TABLE E-17. Databases Used (Continued). (Item 3.9)

LOCATION	GROUP	ITEM	DESCRIPTION
Scott AFB Illinois	Bio-Env. HQ MAC/XGPE	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. In-house ETAC database 2. Datsave - ETAC 3. 4. Western space and missile
Eglin AFB Florida	Envir. Protection AD/DEEVE	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Field data, USAF agencies, universities 2. USAF, OEHL, AQAM, ETIS 4. *All USAF agencies*
	Bio-Env. BASE SGPE	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Field data, USAF agencies

TABLE E-17. Databases Used (Continued). (Item 3.9)

LOCATION	GROUP	ITEM	DESCRIPTION
Hanscomb AFB Mass.	Middle Atmosphere Technology AFGL	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Field data, databases 2. AFGWE, World data center 3. AFESC, AFWS 4.
Los Angeles Worldway Center CA	Env. Protection Committee HQ SD/WE	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Field data, USAFETAC 2. Climatology - USAFETAC; Modelling - Marshall Space Flight Center
Robins AFB Georgia	Envir. Planning Division HQ AFRES/DCS	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Field data, CERL database, local planning and env. agencies 2. ETIS, CERL, USAF 3. 4. Subordinate echelons of AFB reserve - CERL/ETIS data

TABLE E-17. Databases Used (CONCLUDED). (Item 3.9)

LOCATION	GROUP	ITEM	DESCRIPTION
Vandenberg AFB CA	Missile System Safety WSMC/SEM	1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	1. Weather Squadron
		1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	
		1. Source of Data 2. Databases in Use 3. Knowledge of data sources 4. Shared data 5. Data Collection 6. Data Standardization/ Coordination 7. Usefulness of Data Network	

4. Analytical Tools Used

3.10.1 Analytical Tools
(Summary)

Manuals, charts, etc.	A lot	=	18	(62%)
	Some	=	10	(34%)
	None	=	1	(4%)
			29	
Desk Top Units	A lot	=	13	(45%)
	Some	=	11	(38%)
	None	=	5	(17%)
			29	
Minicomputers*	A lot	=	8	(28%)
	Some	=	9	(31%)
	None	=	12	(41%)
			29	
Mainframe Computers*	A lot	=	8	(28%)
	Some	=	9	(31%)
	None	=	12	(41%)
			29	

* The fact that these figures are identical does not reflect identical use of minis and mainframes; varied patterns coincidentally produced the same figures.

2.10.2 Analytical Locations

Performed in-house	=	25 groups	(86%)
Performed by consultants	=	11 groups	(38%)
Performed by other USAF groups	=	8 groups	(28%)

3.10.1 Analytical Tools See Table 15
(Detail)

TABLE E-18. Analytical Tools and Processes Used. (Item 3.10.1)

KEY

● A LOT
0 SOME
O NONE

LOCATION	GROUP	MODES OF CALCULATION: MANUALS, CHARTS, ETC.	MODES OF CALCULATION: DESK TOP UNITS	MODES OF CALCULATION: MINI-COMPUTER	MODES OF CALCULATION: MAIN FRAME COMPUTER	PERFORMANCE BY: IN-HOUSE	PERFORMANCE BY: CONSULTANTS	PERFORMANCE BY: OTHER USAF GROUPS
Tyndall AFB Florida	Air Quality HQ AFESC/RDVA	●	●	0	●	X	X	
	BASH HQ AFESC/DEVN	0	0	0	0	X	X	X
	Bio-Env. Engineering BASE SGPM	●	O	O	●	X		X
	Community Planning HQ AFESC/DEV	●	0	0	0	X	X	
	Env. Chemistry HQ AFESC/RDVC	●	●	●	O	X		
	Env. Engineering HQ AFESC/RDVP	●	0	O	O	X		
	Env. Planning HQ AFESC/DEV	0	0	O	0	X	X	
	Env. Sciences HQ AFESC/RDVC	0	0	0	O	X	X	
	Meteorology HQ AFESC/WE	0	O	O	0	X		
	Natural Resources Div HQ AFESC/DEVN	0	0	O	0	X		
Scott AFB Illinois	Aerospace Sciences HQ ANS/DNXP	●	●	O	●	X		
	Bio-Env. Engineering HQ MAC/XGPE	●	0	0	●	X		
	Env. Planning DCS/CIVIL	●	0	O	O	X		
	Env. Simulation USAF ETAC	0	●	●	●	X		
Brooks AFB Texas	Air Quality USAF OEHL/ECA	●	●	●	O	X	X	X
	Env. Assessment USAF OEHL/ECE	●	●	●	●	X	X	
	Env. Chemistry Br. USAF OEHL/SAN	0	0	0	0	X	X	X
	Radiation Ser. Branch USAF OEHL/RZI	●	●	●	0	X		
	Water Quality USAF OEHL/ECW	0	●	0	O	X	X	
Eglin AFB Florida	Bio-Env. Engineering BASE SGPE	●	O	O	●	X		
	Env. Protection AD/DEEVE	●	O	●	●	X		
Randolph AFB Texas	Bio-Env. Engineering BASE SGPM	●	●	●	O			X
	Env. Planning HQ ATC/DEV	●	0	O	O	X	X	X

TABLE E-18. Analytical Tools and Processed Used.(Concluded) . (Item 3.10.1)								
LOCATION	GROUP	MODES OF CALCULATION				PERFORMANCE BY		
KEY ● A LOT ◐ SOME O NONE		MANUALS, CHARTS, ETC.	DESK TOP UNITS	MINI-COMPUTER	MAIN FRAME COMPUTER	IN-HOUSE	CONSULTANTS	OTHER USAF GROUPS
Hanscom AFB, Mass	Middle Atmosphere Techology AFGL	O	●	●	●	X		
Kelly AFB Texas	Env. Engineering BASE AFB/DEPD	●	●	O	O			
Los Angeles AF Systems California	Env. Protection HQ SD/WE	●	◐	O	O	X		
Offut AFB Nebraska	Bio-Env. Engineering HQ SAC/SGPB	◐	O	◐	O			X
Odgen Eng. Center Utah	Aircraft Systems TRW	●	●	◐	●	X		
Robins AFB Georgia	Env. Planning HQ AFRES/DCS	◐	O	O	◐	X		

5. Analytical Features Needed

TABLE E-19. Summary of Features Needed for Environmental Analysis. (Item 3.10.3)

APPLICATION AREA	NUMBER OF FEATURES IN CATEGORY — DESIRABILITY WEIGHTING X4 MANDATORY	X3	X2 DESIRABLE	X1	TOTAL NUMBER OF FEATURES IN CATEGORY	AVERAGE — DESIRABILITY RANKING ALL FEATURES	PERCENTAGE DESIRABILITY ALL FEATURES
HYDROLOGY	1	7	4	1	13	2.6	65%
CHEMICAL SPILLS	5	0	0	0	5	4.0	100%
GROUNDWATER	7	3	2	0	12	3.4	85%
WATER QUALITY	4	10	10	4	28	2.8	70%
NOISE	6	5	3	2	16	2.9	73%
AIR QUALITY	8	1	0	0	9	3.9	97%
INDUSTRIAL HYGIENE	8	0	0	0	8	4.0	100%
TOTAL NUMBER	39	26	19	7	91	3.4	85%
TOTAL PERCENTAGE	43%	29%	21%	8%	100%	84%	--

TABLE E-20. **Analysis Features Needed for Surface Water.** (Item 3.10.3)

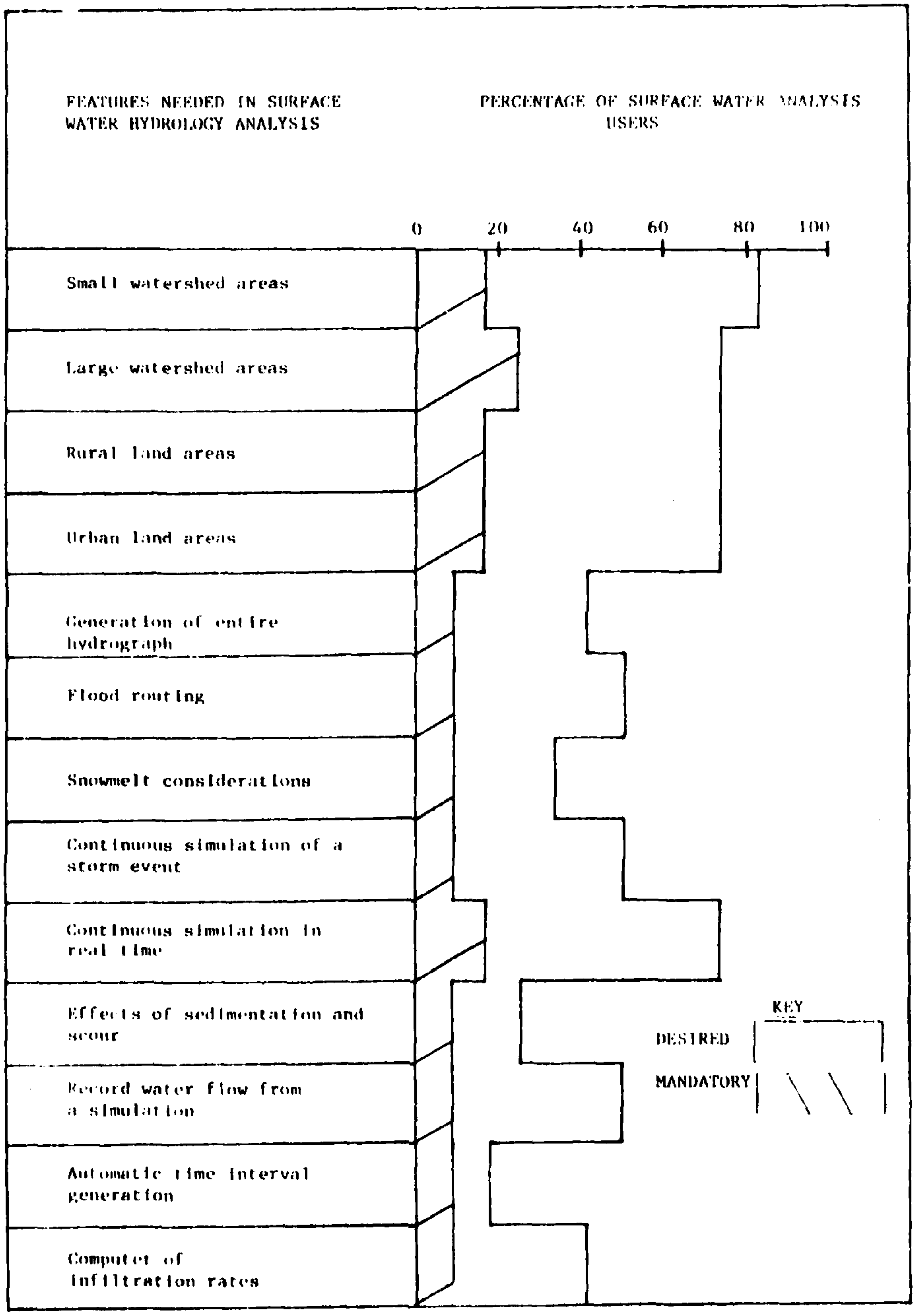


TABLE E-21. Analysis Features Needed for Air Quality.
(Item 3.10.3)

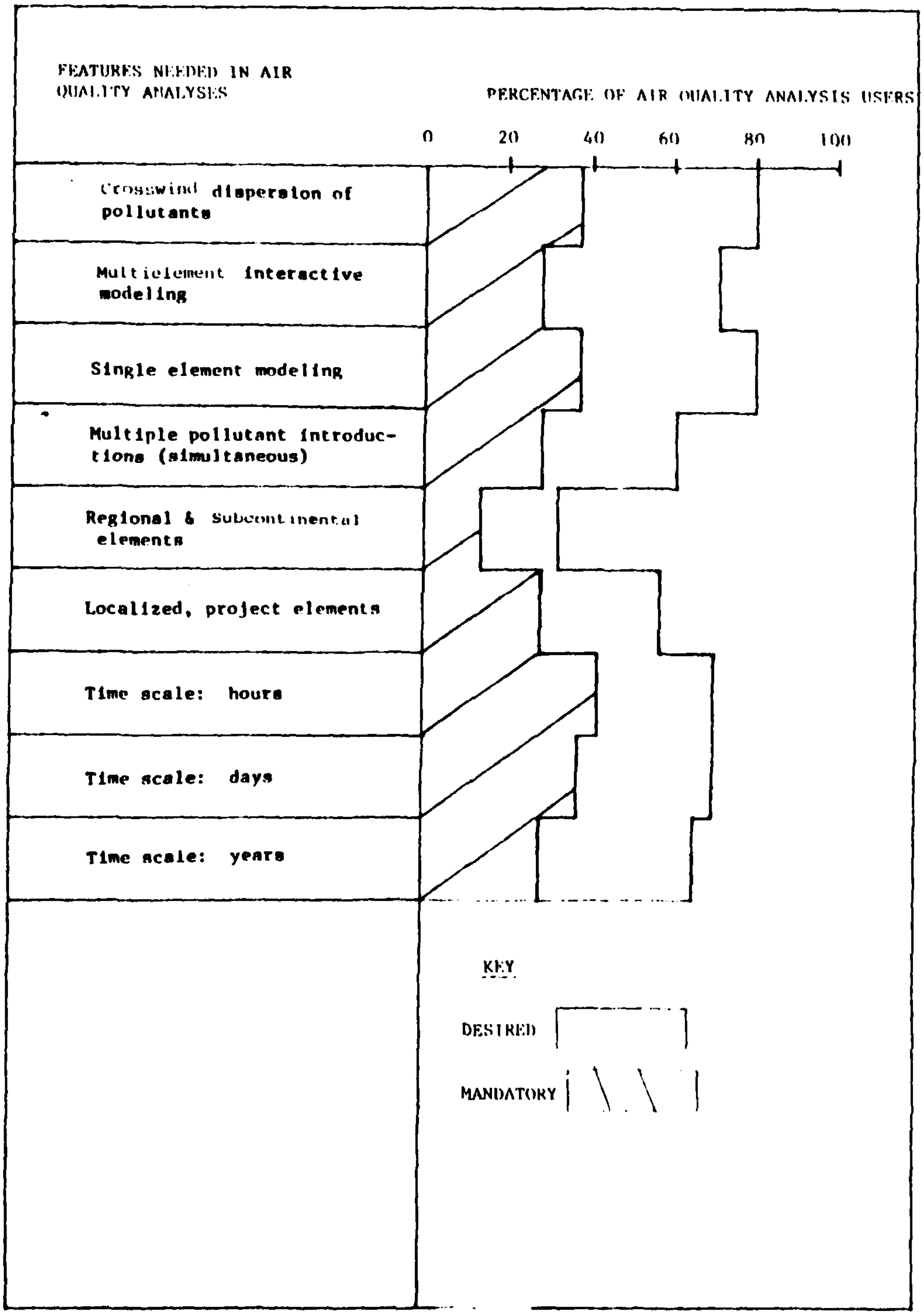


TABLE E-22. Analysis Features Needed for Wa[illegible] Quality. (Item 3.10.3)

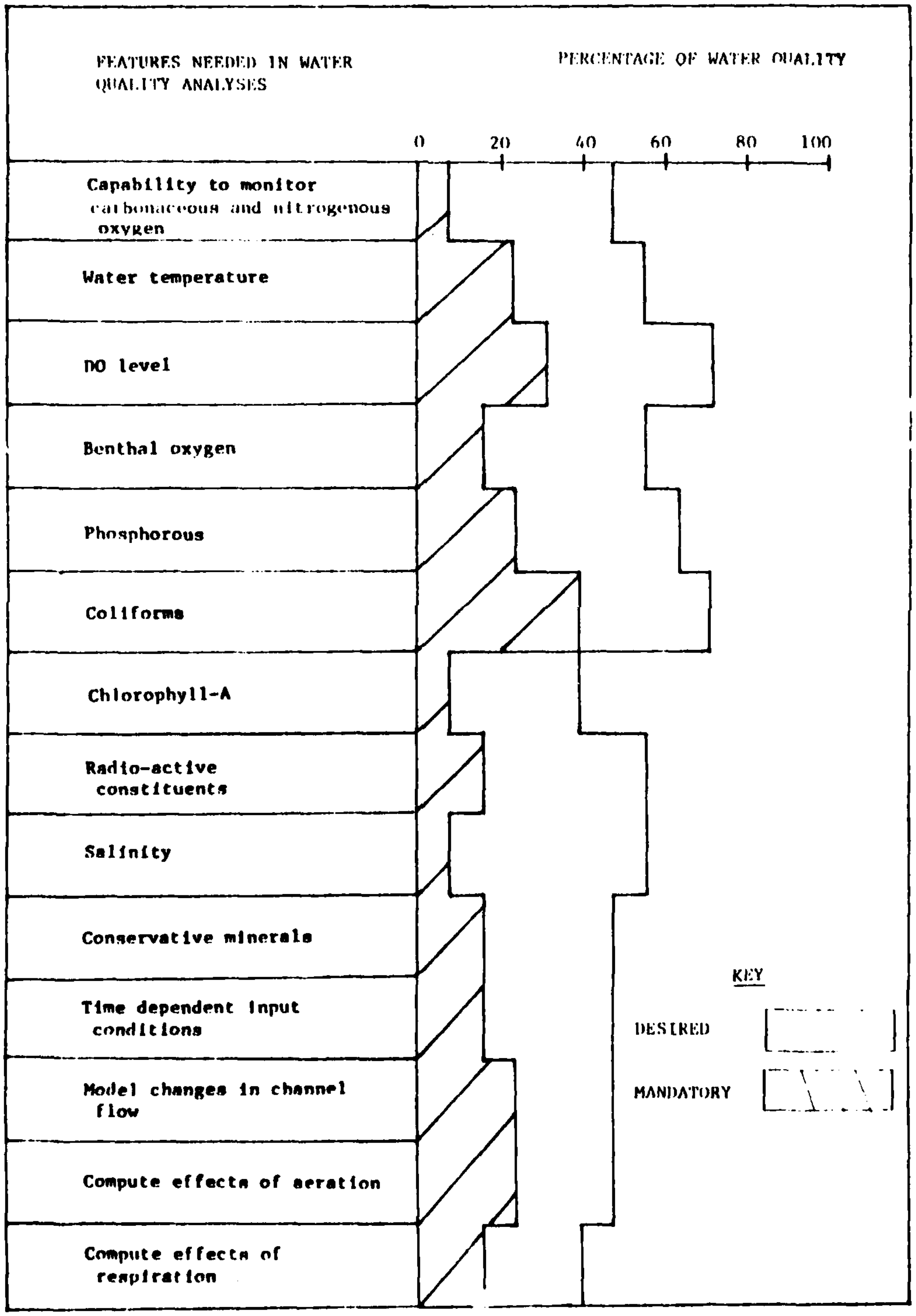


TABLE E-22. Analysis Features Needed for Water Quality (Concluded). (Item 3.10.3)

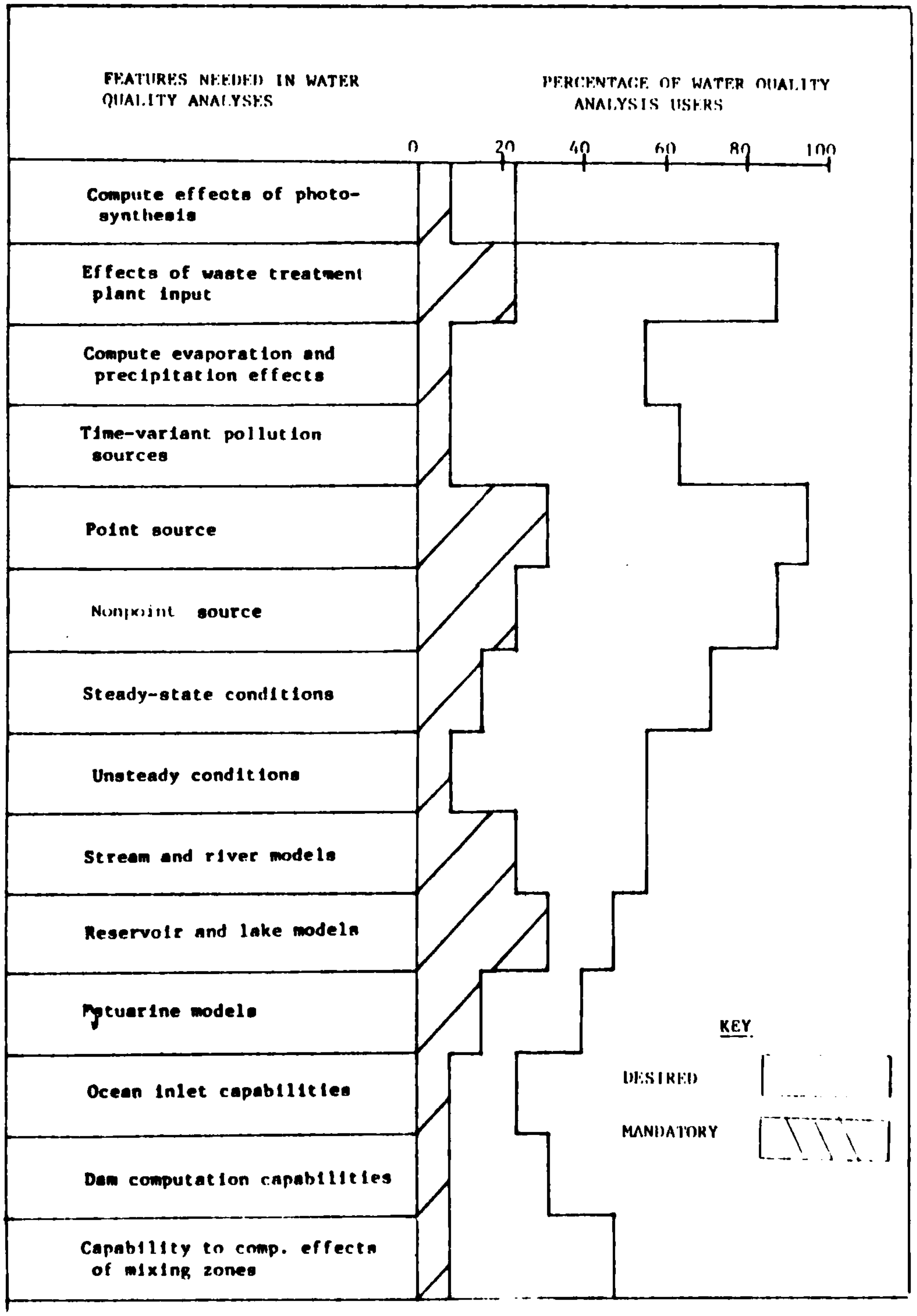


TABLE E-23. Analysis Features Needed for Noise.
(Item 3.10.3)

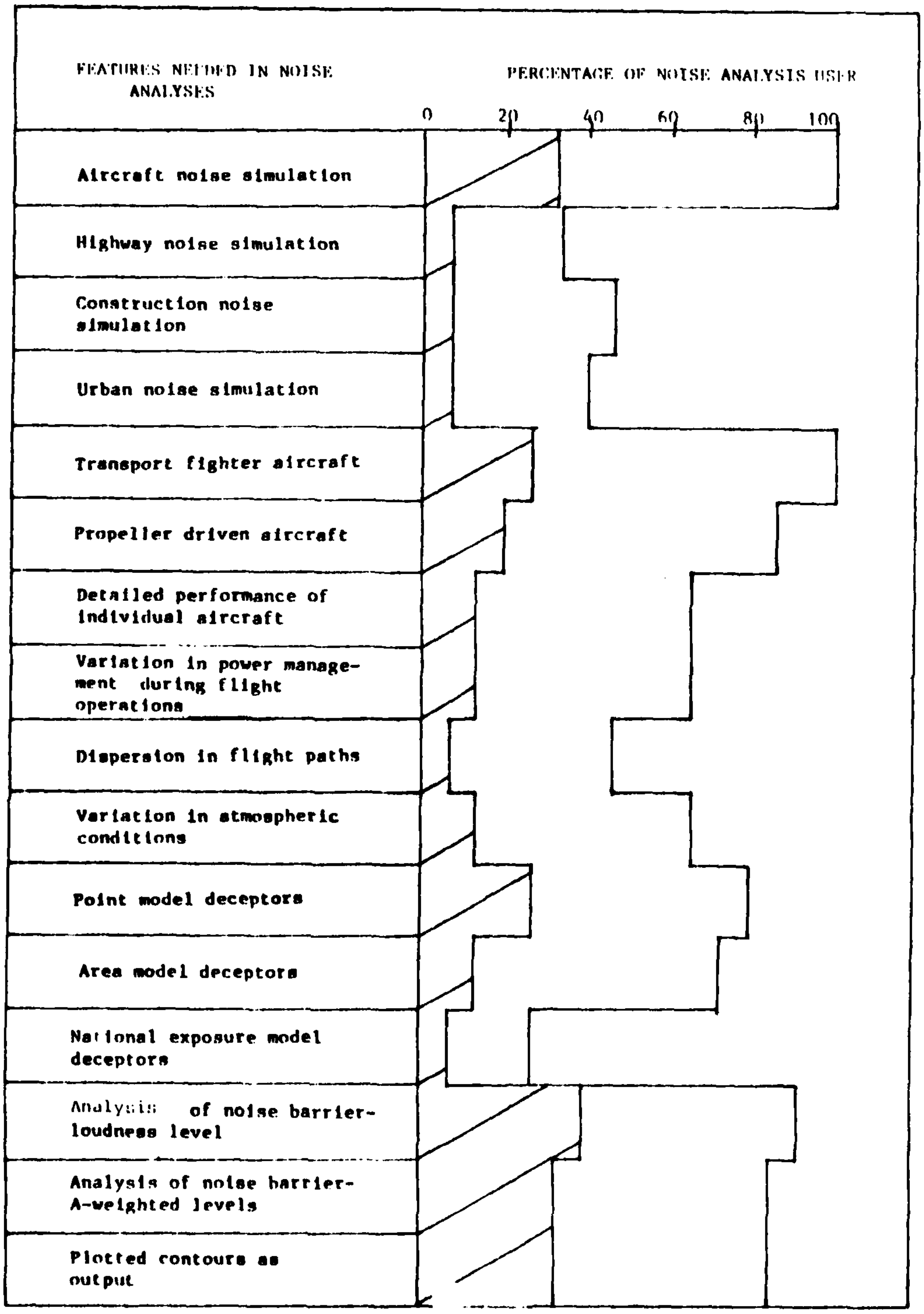


TABLE E-24. Analysis Features Needed for Chemical Spills.
(Item 3.10.3)

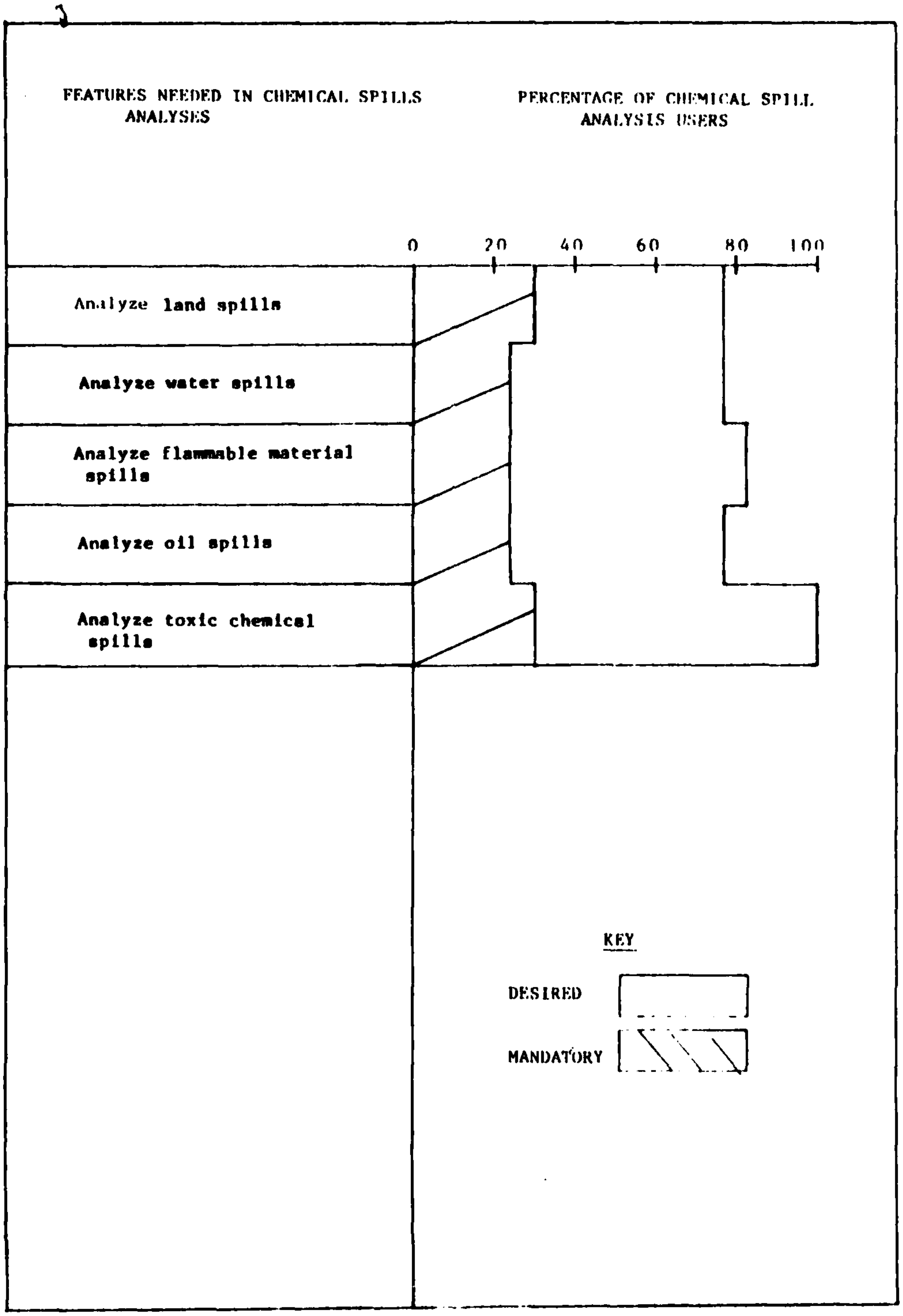
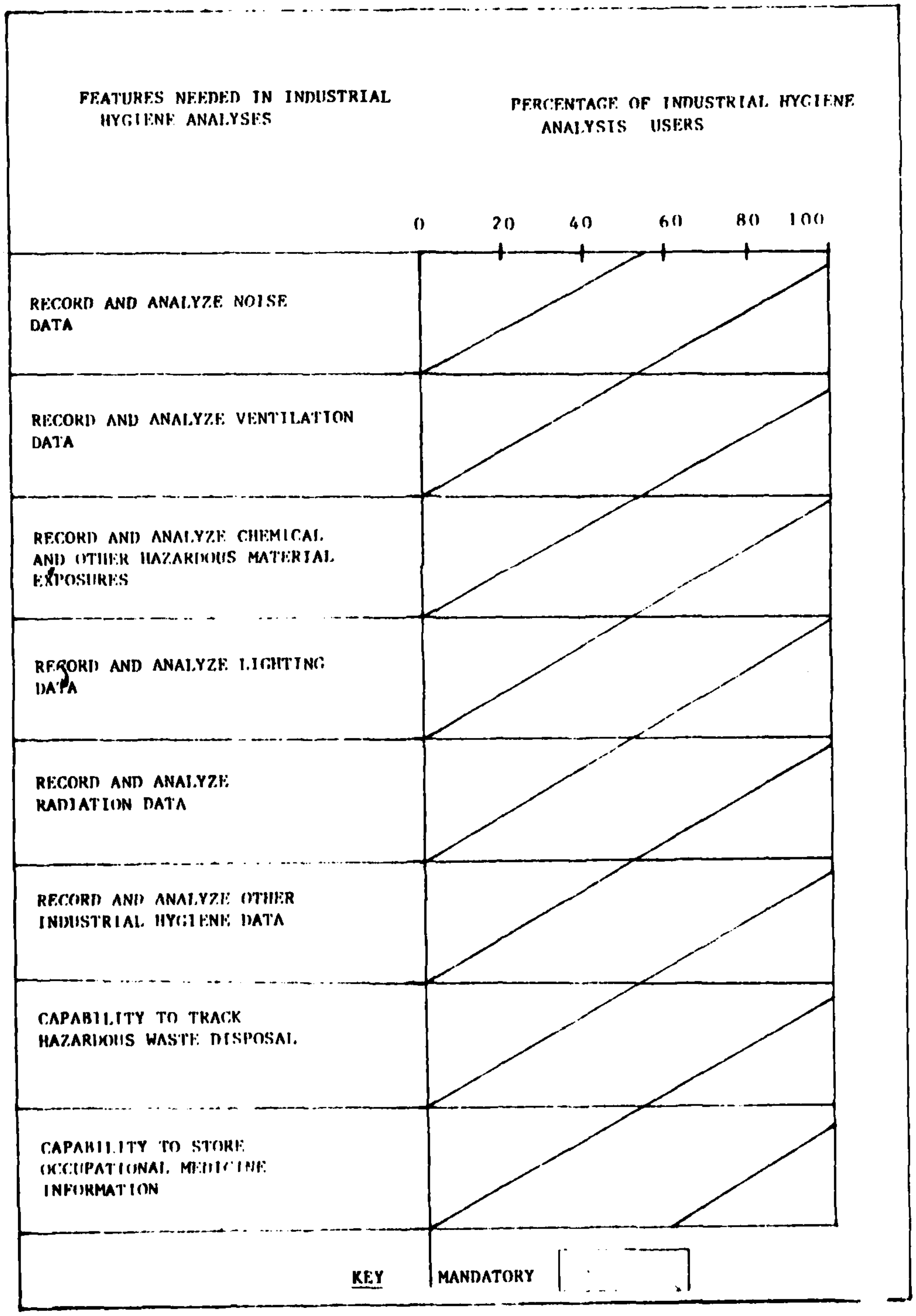


TABLE E-25. Analysis Features Needed for Industrial Hygiene.
(Item 3.10.3)



6. Sources of Software

TABLE E-26. Sources of Environmental Software. (Item 3.10.4)

LOCATION	GROUP	USAF		FED. GOVT.		USER GROUPS				MISCELLANEOUS SOURCES			
		INTERNAL DEVELOPMENT	USAF FACILITIES	HYDROLOGICAL ENG. CENTER	SOIL CONSERVATION CENTER	ICES	CEPA	HEEP	OTHER	COMMERCIAL TIME SHARING	UNIVERSITY SOURCES	PRIVATE COMPANIES	OTHER
Tyndall AFB Florida	BASH HQ AFESC/DEVN	X	X								X	X	
	Community Planning HQ AFESC/DEV	X	X										
	Div. of Natural Resources HQ AFESC/DEVN	X			X						X		
	Div. of Env. Protection HA QFESC/DEV			X	X							Nat. Plan Data Co.	
	Meteorology HQ AFESC/WE			X	X								
	Env. Sciences HQ AFESC RDVC	X		EPA						DIALOG			
Scott AFB Illinois	Aerospace HQ ANS/DNXP	X	X										
	Bio-Env. Engineering HQ MAC/XOPE	X	X	EPA X									
	Env. Planning DCS/CIVIL		X	EPA X	X								
	Env. Simulation USAF ETAC	X								X	X		
Brooks AFB Texas	Air Quality USAF OEHL ECA			EPA X									
	Env. Assess. USAF OEHL ECE	X	X										

TABLE E-26. Sources of Environmental Software (Concluded) (Item 3.10.4)

LOCATION	GROUP	USAF		FED. GOVT.		USER GROUPS				MISCELLANEOUS SOURCES			
		INTERNAL DEVELOPMENT	USAF FACILITIES	HYDROLOGICAL ENG. CENTER	SOIL CONSERVATION CENTER	ICES	CEPA	HEEP	OTHER	COMMERCIAL TIME SHARING	UNIVERSITY SOURCES	PRIVATE COMPANIES	OTHER
Brooks AFB Texas	Env. Chemical Branch USAF OEHL/SAN	X	X								X		
	Radiation Services USAF OEHL/RZI	X											
	Water Quality USAF OEHL/ECW												
Eglin AFB Florida	Env. Protection AD/DEEVE					X	X	X		X	X	X	
Randolph AFB Texas	Aerospace Med. BASE SGPM		X										
	Env. Planning HQ ATC/DEV		X										
Hanscom AFB Mass.	Middle Atmosphere Technology AFGL	X									X	X	
Los Angeles Worldway Center, CA	Env Protection Committee HQ SD/WE	X	X								X	I.C. Wiggins Aero-space	
Wright-Patterson AFB, Ohio	Env Planning Section BASE ABW/DEEX	X	X	EPA X							X		

7. Environmental Model Use

TABLE E-27. Environmental Model Use. (Item 3.10.5)

LOCATION	GROUP	ITEM	ARM	NPS	AFRUM	WHTM	ATM	AQAM	APRAC	CDM	CRSTER	PAL	PTDIS	PTMAX	PTMTP	RAM	VALLEY	EXAMS	PRICKETT-LONNQUIST	CHRIS	HACS	SAM
Tyndall AFB Florida	Director of Env Planning HQ AFESC/DEV	Heard of Model											x	x								
		Require Use											x	x								
		Frequency of Use											Occas.									
		Adequate.											x	x								
	Meteorology HQ AFESC/WE	Heard of Model					x			x	x	x	x									
		Require Use					x			x	x	x	x									
		Frequency of Use					Occasionally															
		Adequate.					x			x	x	x	x									
	Eng. and Services Lab. HQ AFESC/RP	Heard of Model				x		x		x	x	x	x	x	x	x	x					x
		Require Use						x														
		Frequency of Use																				
		Adequate.																				
Scott AFB Illinois	Aerospace HQ AWS/DNXP	Heard of Model						x	x	x	x	x	x	x	x	x	x			x	x	x
		Require Use																				
		Frequency of Use																				
		Adequate.																				
	Bio-Env. Engineering HQ MAC/XGPE	Heard of Model						x	x	x	x	x	x	x	x	x	x	x	x			
		Require Use										x	x	x	x							
		Frequency of Use																				
		Adequate.									Adequate.											
Brooks AFB Texas	Env. Assessment USAF OEHL/ECE	Heard of Model						x				x	x	x	x	x						
		Require Use						x				x	x	x	x	x						
		Frequency of Use						Occasionally														
		Adequate.																				
Los Angeles Worldway Center, CA	Env. Protection Committee HQ SD/WE	Heard of Model															x					
		Require Use																				
		Frequency of Use																				
		Adequate.																				
Ogden Eng. Center Utah	Aircraft Systems TRW	Heard of Model					x	x	x	x	x	x	x	x	x	x	x					
		Require Use						x														
		Frequency of Use					Occasionally															
		Adequate.																				
Robins AFB Georgia	Env. Planning Division HQ AFRES/DCS	Heard of Model	x	x																		
		Require Use																				
		Frequency of Use																				
		Adequate.																				

TABLE E-27. Environmental Model Use (Concluded). (Item 3.10.5)

LOCATION	GROUP	ITEM	ARM	NPS	AFRUM	WHTM	ATM	AQAM	APRAC	CDM	CRSTER	PAL	PTDIS	PTMAX	PTMTP	RAM	VALLEY	EXAMS	PRICKETT-LONNQUIST	CHRIS	HACS	SAM
Wright-	Env.	Heard of Model						x		x	x			x	x					x	x	x
Patterson	Planning	Require Use																		x	x	x
AFB, Ohio	Section	Frequency of Use																				
	BASE ABW/DEEX	Adequate.						x		x												

SECTION VI

RESPONSES TO QUESTIONNAIRE SECTION 4

UNSTRUCTURED COMMENTS

1. INTRODUCTION

In June 1981 staff of General Software Corporation (GSC) interviewed Air Force personnel at the following Air Force bases, Tyndall, Eglin, Brooks, Randolph, Kelly and Scott. A questionnaire was used to determine Air Force requirements and capabilities for environmental information. The final section invited unstructured comments and was introduced as follows:

> "This is an unstructured section of the questionnaire which invites your comments and suggestions. Please note here your opinion of the questionnaire and any detailed comments, criticisms or answers to questions that should have been asked but were omitted. If you think that the questionnaire successfully covered the areas of your concern please note this also.
>
> The basic purpose of this questionnaire is to provide information for proposals to enhance the environmental information support service available to the Air Force. This information network could include data, hardware, software and groupings of people and skills. The network could be organized and could communicate in many different ways. Please note here any thoughts and suggestions for networking environmental data and analysis techniques that you have, or improvements which you would like to see.
>
> You may be sure that all the information that you give in this questionnaire will be carefully read and analyzed, some answers may be coded and computer analyzed. Your needs and suggestions will be the basis for further work. The more you can tell us, the more future enhancements can respond to your needs."

Completion of this part of the questionnaire was optional and many chose to add nothing, considering that the previous sections of the questionnaire adequately answered their concerns. The following text lists all those who did answer this section and their answers. Some of these were written, some extracted by GSC staff from spoken commentaries.

2. COMMENTS

TYNDALL AIR FORCE BASE
AIR FORCE ENGINEERING AND SERVICES
CENTER, RESEARCH AND DEVELOPMENT DIVISION
(AFESC/RD)

Major Steve TerMaath
Chief Environmental Engineering Branch
AFESC/RDVW
Tyndall AFB, FL 32403

The rapid rotation of military staff causes technical forgetfulness; we keep reinventing the wheel. We need a durable, accessible catalog, a corporate memory, which can improve with time. This could be an important function of an information network. We need Air Force-oriented archiving and indexing of environmental information, the NTIS keywords are not useful; we need indexing by chemicals and by weapons systems; and we need indexed technical reports on specific environmental systems.

Captain F. Miller
Chief Bioenvironmental Engineer
USAF Hospital SGPM
Tyndall AFB, FL 32403

My main problem is the long time, 4-8 weeks, taken by OEHL to test environmental samples. This testing must be central because of the expensive equipment needed such as gas chromatographs, and, since OEHL receives samples to test from all over the world, the delay is understandable, but my base requirements urgently need faster turnaround.

Colonel Francis B. Crowley III
Director Engineering and Services Lab
AFESC/RD
Tyndall AFB, FL 32403

An environmental information system must be useful to the people who need it. I would like to see the maximum amount of decentralization which is feasible and economic, a modular system, so that each user can select only needed capabilities. A network should be compatible with existing systems and should build on them. Software transportability is important, FORTRAN is good for science but not necessarily the best for all uses.

Noise modeling is an important Air Force need with graphic output which can be overlaid on a map. This is needed for missile sites and runways. The implementation of a network should start modestly with a needed and practical capability which would give a real-world payoff immediately.

Captain Woessner
Captain James K. Hood
Staff Meteorologists
AFESC/WE
Tyndall AFB, FL 32403

Our main problem is getting meteorological data in the different required forms. Local data is needed for Air Force base studies. This is not always available. Data may only be available from National Weather Service locations distant from the base. This is not adequate to input the air models that we use occasionally or other metheorological data needs.

Mr. Bernard Lindenberg
Mr. Myron Anderson
Environmental Engineers
Environmental Planning Division
AFESC/DEVP
Tyndall AFB, FL 32403

The most important elements of a computerized information network are simple system access and easy understanding of system contents.

Lt. Col. Jimmy N. Fulford
Environmental Scientific Analyst
AFESC/RDVA
Tyndall AFB, FL 32403

We require a system to advance the state-of-the-art general environmental data base structures and applications software. We need tools to transfer data bases and application software. Documentation is also a great problem,along with information on existing programs.

1Lt. Peter F. Jaskilka
Environmental Engineer
AFESC/DEVP
Tyndall AFB, FL 32403

We need a ready and efficient way to provide economic and environmental information due to (the need to study) alternatives.

Major Gerald L. Plummer
Aircraft Noise Analysis Branch
HQ AFESC/DEVC
Tyndall AFB, FL 32403

Data acquisition and maintenance should be standardized and made available via a centralized facility.

Mr. Allen Nixon
Environmental Protection Planning
HQ AFESC/DEVP
Tyndall AFB, FL 32403

Software coordination would be beneficial but a mandate must be associated with its use to force compliance.

DOD Comprehensive Economic Analysis System

1. Impact of alternative actions
2. Statistical cultural regions
3. Economic status
4. Develop procedures
5. Significant impacts
6. Training package for program

Joint between AF and Army

2Lt. David G. Roe
Air Quality Research Engineer
AFESC/RDVA
Tyndall AFB, FL 32403

1. Will hand-held calculator programs be included in this information network?

2. It seems that you concentrate on large frame computers and programs. Knowing that cross-use of most programs requires adjusting a program before it will run or a different computer, who will do this adjusting or even the maintenance?
3. From a user standpoint, when I need to run a program and don't have the expertise, who will assist me? Will there be a lot of user documentation or an expert to consult?

Mr. Charles F. Lewis
Division of Community Planning
(of the Directorate of Environmental Planning)
HQ AFESC/DEVC
Tyndall AFB, FL 32403

I would like to see more of the technical capability now available applied to replace routine drudge work in these activities. For example, desk-top facilities to display slides, tables (environmental), etc., to copy or word-process right at the work station. In other words, the sophisticated data analysis capability is less useful to me than something that would allow me to handle more efficiently the data I have.

Good questionnaire but not terribly appropriate to my function or interests. I suggest you ask Lt. Roe to introduce you to Maj. J.D. Thompson (RDVA).

Mr. Arturo McDonald
Environmental Planner
4756 Civil Engineering Squadron/
Environmental Planning CES/DEEV
Tyndall AFB, FL 32403

Area covered in this questionnaire are way over the everyday environmental actions on a typical Air Force installation. This type of sophisticated environmental analysis will normally be done at MAJCOM or USAF level.

The principal need for a base environmental planner is not an environmental information network, but the reduction or elimination of some of the ever-increasing paperwork required by EPA, state and USAF. Real environmental protection suffers because of this redundancy. Also, specific support and training in critical areas are lacking such as hazardous waste handling and disposal. We receive sufficient information but few applicable tools or resources.

Major Ronald L. Hawkins
Project Officer, ETIS
HQ AFESC/DEVP
Tyndall AFB, FL 32403

The questionnaire was vague in places. Necessarily so, because the questioners were not dealing with real computer people. We are more on the user end and have acquired knowledge of computer programs by the demands of our jobs.

In organizing the network for the modeling applications library, I strongly urge you to take a close look at the strengths and weaknesses of the present Environmental Technical Information System (ETIS) as used by the Air Force and Army. ETIS programs were designed for use in the environmental impact analysis process. It was designed to be an easily used system by persons with no computer background. It was designed to be interactive program with batch capability. It was designed for use by an all levels of the Air Force.

One of the strengths of the system is the language of the commands to retrieve the data. The programs are written in C language. The commands are English language. The programs prompt and give a help message if requested. There is no calling for tapes, no special manipulation of files, and no waiting for output.

Another strength is the minicomputer on which the system is mounted. The computer is, in effect, dedicated to the CERL ETIS programs. It has a text-editing capability that uses some of the CPU time.

Another strength is the short time needed for training in data retrieval. CERL provides a two-day training program for Army users. The users can log in and start searching the programs by the end of the first morning. By the end of the second day, they can find their way through all the programs and retrieve and data they want.

Another strength is that on new programs we have helped develop have a definite user stamp of approval before they are implemented. If we at AFESC could't accept the program, the CERL programmers worked until the program did what we wanted.

The ETIS is accessible by (1) a regular commercial telephone number, (2) a FTS (Federal Telephone Service) number, (3) a tollfree Inward WATS (800) number, and (4) the TELENET public data communications network. No matter where you are (even Hawaii or Alaska) in the U.S., you can get into ETIS, day or night.

ETIS has an electronic mail service that enables user to write to each other. A user can create his own files and copy them to the directories of other users.

There has been little down time with the system. The disks for storage have had few problems. The 800 telephone number has been absolutely excellent for data transmission. A clear signal and very little line noise are present.

Inertia has been a big program for ETIS. As long as things go along the way they have been, why change? There have been some fears of a "black box" approach to environmental analysis. Costs have been a problem for users. A small terminal costs about $2000. Yet, at base level, this amount of funds never seems to be available for the environmental coordinators or planning.

The personnel at CERL are competent and very easy to work with. Unfortunately, they work for the Army and therefore AF interests have to take a back seat at times.

One program, the Economic Impact Forecast System, is in dire need of updating. Our efforts and money toward CERL have failed to get the current data available from the BEA, Bureau of Census, and Department of Labor. The system is an excellent system for the broad look at an economy. But now, it is obsolescent in regards to the data base on which its projections are based.

The environmental law library is working out very well with both environmental personnel and lawyers using the products. This is being expanded constantly.

The ETIS, in hardware, network, scope, and daily operations, is an excellent example of using a computer to assist the noncomputer types in their jobs. It is responsive. It is a relatively cheap to operate. It is available nationwide. It is in a language that allows very short training for data retrieval. Its data bases can be updated fairly easily. Most importantly, it is in place, network set up, storage spaces available, people trained in its use, and it works.

A recent horrible example in using computers is the MX-MIS, the M-X Management Information System. It was to be all things to all people. It was to have data for all occasions, be accessible by all AF people, be comprehensive enough to answer any question, and it was to have graphics. It was to answer any query by "pushing a few buttons". It was also to be operational in October 1980. At present, there are some terminals sitting in offices, silent. Any lessons learned or principles forged by 3 years of ETIS operations were ignored. The most massive problem facing MX MIS was that its planners did not know what they wanted. They were waiting for a data systems contractor to tell them what they wanted.

Some major thrusts that should be used in the modeling library:

1. A major push by the Operations and Maintenance functions of every level of Engineering and Services to purchase, lease, or beg small terminals for use. These would be the 300 BAUD rate, acoustically coupled terminals. Not only could the engineers and planners use ETIS, but in a very few years, nearly everything pertaining to data (news, economy, employment, land use, population, etc.) will be on a computer somewhere. And most of these computers will have telephone hookup capability.

2. Put as much as possible on one computer, dedicated to the library or engineering function, in a simple language. Perferably this should be a minicomputer for costs.

3. Use the telephone network. Bell Telephone is upgrading its circuits because of the tremendous increase in data transmission. Its customers want clear lines.

4. Use AFESC as the center for getting the programs mounted, converted, changed, and updated on the central computer.

5. For the user, a simple dial up, a simple question and answer English language series of commands, and immediate availability.

6. Also for the users, ability to write their own programs. Most engineering problems are a series of equations. Can't there be a master program written that (1) arranges the equations in sequence, (2) arranges and reads the data, and (3) puts the results out in some kind of standard format?

   In other words, for simple direct relationships between variables and output, let the user go to an instructional program, put in the equations needed, input the data, and have an output showing the results. Should a user go to a class to learn about READ, WRITE, GOTO, IF statements if the computer can logically figure out a sequences of equations?

7. Use the computer to instruct and present a compendium for all the programs available in the modeling library. The UNIX system has an instructional program for creating files, editing, and programming in C language. Why not have an instructional program for each and every modeling application? Have an electronic mail capability to continuously apprise all the users on new ideas and to answer specific questions arising from the use of the models.

8. Get competent people to run the system.

There should be a liaison between the Engineering and Services function and the Data Processing function in the Air Force. The Air Force Data Services Center is chartered to develop standard data processing procedures. Unfortunately, they also want to bend

everyone's methods of doing business to a standard way of using existing Air Force hardware and languages. This is somewhat akin of the Army Signal Corps requirement that the Wright Brothers airplane be capable of being dismantled and hauled about in a mule-drawn wagon. We can do the job with existing Air Force equipment and languages. But by looking across the fence we can see better languages, smaller more powerful machines, and a future where computers are considered office equipment and not a highly specialized piece of equipment. The AFESC should be the leading proponent of doing things in a better way. Therefore the study should include an educational element to tell the current leaders of the engineering function about what is out there, and how to take advantage of the technology. The promises of the modeling library to the worker level will become reality only of top-level managers can see beyond the parochiallism prevalent in the data processing and engineering communities and literally demand the library be used. Only then will the users come up with a good working system. The programmers and managers of the modeling library system should expend maximum effort in making the system user-oriented.

Lt. Col. Boyd T. Duffie, III
Director of Environmental Planning (DEV)
HQ AFESC/DEV
Tyndall AFB, FL 32403

I found the questionnaire very difficult to adapt to my particular level and activity. As discussed with survey personnel, the response to the questionnaire at several successive levels within a Directorate such as mine would appear to give questionable results--or at least the probability of duplication on one extreme and conflicting data on the other. For example, trying to categorize my people by the chart at 1.8 involved a lot of judgmental decision which may well not be the same as those made by one of my subordinate division chiefs addressing the same people. The detailed information on need and use of computer hardware/software is best obtained from responses of subordinates who work with the ADP systems day to day.

As discussed with survey personnel. I generally believe that any efforts or actions to more centralize computer capability or availability of data is a step in the right direction. There is undoubtedly much needless duplication and less than optimum use of existing systems due to imcompatibility of hardware or software, lack of mutual knowledge of available systems, and difficulties with access.

Mr. William Kornman
Natural Resources Division (DEVN)
AFESC/DEVN
Tyndall AFB, FL 32403

The Natural Resources Division (DEVN) could definitely benefit from an Environmental Information Support Service. The mission of DEVN is diverse with liaison with other DOD and Federal agencies critical. The rapidly improving remote sensing and computer technologies have tremendous potential and improved natural resources management will result from using them.

The problem is that current issues, priorities and manning (one-deep in each area of expertise) don't allow time to thoroughly investigate what is available, evaluate its adaptability and implement the ideas.

Gary G. Worley
Air Pollution Research Meteorologist
Assessment Technology Research Branch
HQ Air Force
Engineering and Services Center
HQ AFESC/RDVA
Tyndall AFB, FL 32403

I would have a difficult time completing your survey form because of my R&D position, i.e., neither a user of environmental data/models nor one who provides environmental services. Still, I want to provide you some comments on the current project.

I was one of the originators of the current research when in 1979 I was asked by the Chairman of the JANNAF (Joint Army, Navy, NASA, Air Force) Safety and Environmental Protection Committee to participate in cataloging environmental models. I started encountering more models than I could possibly handle and many more than were pertinent to either AF or JANNAF interests. I limited my project initially to air quality models either in use or needed by the AF. I conducted an AF survey in 1979 and arranged a January 1980 modeling meeting here at Tyndall AFB in which the survey results along with other modeling needs and capabilities were presented. During your Tyndall AFB visit, I provided Mr. Ficke with pertinent material from that meeting, and I believe he has passed it along to you.

Your current project is a follow-on to that effort and a similar AF-wide (written) survey emphasizing water quality models and conducted by Captain Schlossnagle in 1980. With this background information, the two of us prepared the Statement of Work for the Environmental Modeling Applications Library.

The project now seems to have broadened into an environmental information network, which sounds reasonable, but I want to ensure that we do not lose sight of our original objectives which remain as stated in the Statement of Work.

One area that becomes obvious around AF operations people is the real-time response capabilities required of such a system. The areas of disaster preparedness and accident response require rapid access to information which a system like this could provide. It is for this reason that the SOW requires an investigation of present and planned communications systems. AWDS, the Automated Weather Distribution System, will reach every AF base weather station and would certainly seem like a candidate for this AF-specific need.

You are not likely to have this same need expressed by environmental planners, such as you encountered here at Tyndall, and not at all of the Major Commands either. I have been doing considerable work in support of the operational commands, such as HQ SAC, in areas such as toxic spills and dense gas modeling. The primary model in use is the Ocean Breeze/Dry Gulch Model, but these are potential applications for many more operational models (such as the NASA Multilayer Diffusion Model which is now available via telephone dialup). My modeling research is oriented towards an eventual real-time response capability; and the system which you are investigating should certainly accommodate such a need . . . as per our Statement of Work.

Daniel A. Stone
Research Chemist
Headquarters Air Force Engineering and Services Center
HQ AFESC/RDVC
Tyndall AFB, FL 32403

The questionnaire was of somewhat limited utility for a non-supervisory person.

The need for a viable information exchange network is getting more critical. This is true not only in finding basic research data but in transmitting it to others. Standardization of software and hardware would seem to be one potentially powerful way of achieving effective data communication.

Robert G. Blum
Bioenvironmental Engineer
AF Engineering and Services Center
HQ AGESC/RDVW
Tyndall AFB, FL 32403

Our group does have a need to know the effluent water quality and NPDES Permit Standards for AFB wastewater treatment plants (especially the Air Logistics Centers industrial W.W. treatment plants). If effluent pollutant concentrations and standards could be entered into a data base for easy access to our group this would be extremely valuable.

Lt. Dan Berlinrut
Air Quality Research Engineer
Air Force Engineering and Services Center
HQ AFESC/RDVS
Tyndall AFB, FL 32403

I feel that I do not specifically fit into any of the three given categories. My job pertains to research in aerosol sciences and organic mass transfers. I occasionally use computers as tools in performing my work and models to determine my design strategies. I would appreciate having a library system keeping me abreast of all models so that I could more effectively utilize these available tools.

James D. Thompson
Environics Division, Assessment Technology Group
HQ AFESC/RDVA
Tyndall AFB, FL 32403

The concept of an environmental network system is excellent. Too often, too much time is spent obtaining quality data for environmental analysis. Demographic, geographic, socioeconomic, and topographic (land-use) data are crucial to good analysis. Programs (codes) to format data, perform computations on dispersion characteristics, and display the time/concentration levels to specific geographic areas within air or water ecosystem are essential to our organization's mission. We often tailor other organization's (or contractor's) programs for Air Force unique activities.

Our limitation is the use of classified data (confidential, or secret) resulting from AF weapon system tests or training activities.

The data bases we use are for official use only and reliable to DOD approved users cleared for access to classified data. The reports or documents resulting from use of the classified data, are almost always, unclassified. Our laboratory would therefore, be a major user

of environmental data, but would be reluctant to provide access to our own classified data bases unless the user has proper clearance.

If there were proper security requirements available for the handling (processing and transmission) of classified data, then the proposed system would certainly be useful and meet our needs.

SCOTT AIR FORCE BASE
ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER (ETAC)
AIR WEATHER SERVICE (AWS)

Captain Jon R. Kahler
Assistant Chief Aerospace Physics
and Space Sciences Division
HQ AWS/DNXP
Scott AFB, IL 62225

There is an urgent need for an emergency response capability; this would be one of the most useful functions of an environmental information network. This would include rapid access to environmental models and data bases. The speed of access is critical for emergency response and it is essential that the system should be interactive and user friendly. I am in favor of collaboration with other federal agencies especially EPA, FEMA, DOT and the U.S. Coast Guard.

Major Albert Boehm
Chief, Probability and Statistics Section
Aerospace Sciences Branch
USAF ETAC/DNP
Scott AFB, IL 62225

Users vary greatly according to educational background. More documentation or training is needed for those that are inexperienced. Gross errors are often made by those who don't know. How are these people screened; how are they trained? Should programs be rated "G GP R X"!? according to foolproofness?

- How will programs be upgraded?
- Who will decide if they are OK?
- What are effects of pollution/air quality on electro optical transmission and seeability.
- Land usuage - what type vehicles can cross - trafficability - during which seasons - during certain weather conditions.
- What is the longest unit (duration) before land can be used (transversed, plowed, etc.)

Mr. George H. Gauger
Community Planner
375 ABG/DEEV
Engineering and Environmental Planning Branch
Scott AFB, IL 62225

This questionnaire was answered from the point of view of the Environmental Planning Section of the Scott AFB Civil Engineering Squadron. Since the base is required to comply with all environmental laws we try to do this as best we can. The biggest problem may not be the information available but in knowing what has to be done in order to comply with the various laws and then being able to get your hands on the appropriate information. Requirements vary considerably. Information available should be geared to meet the needs of existing Air Force programs or laws (state, local, etc.) which affect the base engineer.

The base engineer is not involved in too many programs which extend beyond base boundaries although the base may participate in program off base. This will vary from base to base.

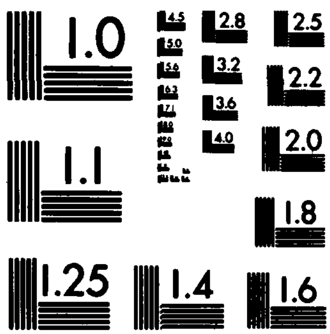
Lt. Colonel Sartor
Vice Commander
USAF ETAC
HQAWS
Scott AFB, IL 62225

The idea of networking environmental information in the Air Force is good but successful implementation will depend on the funding priority that it receives. Funds go first to priority 1/1 projects, for example the space shuttle. Planning, even for priority 1 projects, may be as low as priority 4. When presenting the idea of this environmental network the key criterion for assigning funding priority will be potential cost savings; this should be stressed. A useful contact who may support this project is Colonel Moss, in the Office of Federal Coordination in the Pentagon. He works on tri-service coordination and coordination between military and civilian federal agencies.

The Air Force has a need for a better meteorological data base. We talked about this in the early 70s and proposesd a central computer storing world meteorological data with remote access to all DOD agencies. This computer would also have satisfied the need for simulation capability. AWS was given the responsibility of building a 10-year on-line global weather data base and worked on this during 72, 73, and 74. This was the original justification for ETAC acquisition of ARPANET. The original idea was to store the data on a laser

AD-A133 453 FEASIBILITY STUDY FOR AN AIR FORCE ENVIRONMENTAL MODEL AND DATA EXCHANGE..(U) GENERAL SOFTWARE CORP LANDOVER MD S MCKENZIE ET AL. AUG 83 AFESC/ESL-TR-82-13-VOL-2 4/4

UNCLASSIFIED F/G 9/2 NL


1.0
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1.4
1.6

recording device, this failed. Magnetic tape was tried; this was too slow. The project was then moved to the west coast where it died.

Base meteorologists, typically with master's or doctorate degrees, would like local computing capability linked to a central computer but this has a Code 4 (low) priority for funds.

Captain Patrick Herod
Chief Bioenvironmental Operations Section
USAF/ETAC
Scott AFB, IL 62225

This survey adequately covered my concerns but there is a need to be careful about making environmental models available to anyone. People may use the output blindly without knowing the assumptions. I think computer networking is needed but response time will vary by user demand and will therefore be time-of-day oriented.

Lt. Colonel Pickett
MAC Bioenvironmental Engineer
HQ MAC/SGPE
Scott AFB, IL 62225

The questionnaire covered my concerns well. We need better access to environmental, health and toxicology data. OEHL is presently proposing a computerized information sytem (COHP) and the network which you are suggesting should be closely linked to this. The information should include hazardous chemical nomenclature, inventory and audit and accident response procedures. NIOSH, HACS and CHRIS data should be included. It these data bases were available then we would need better analysis, modeling and mapping capabilities. There is a great need in the Air Force to keep up to date on what is happening elsewhere. An information network could help with this. It would be nice to have an overview at the next Air Force Bioengineering symposium (contact Colonel Furtado AF MSC/SGPA Autovon 240 2452).

Captain Emil M. Berecek
Environmental Simulation Analyst
MAC/AWS/AFGWC/USAF ETAC/DN/Environmental Simulation Section
USAF ETAC/DNS
Scott AFB, IL 62225

I feel there is a distinct need for a centralized collection of environmental models. However I see very little use by my particular section.

We produce very specific system- or mission-related models that have little of no general application.

Captain Ronald C. Gilchrist
Assist. Chief Simulation Section
DN-Aerospace Sciences Branch USAFETAC
Scott AFB, IL 62225

As a first step, I would recommend compiling and publishing a catalog of who has what software, what is it designed to do, who maintains it, and how to obtain it from them (when transfer of software is allowed).

Mr. Walter S. Burgmann
Director, AWS Technical Library
AWS Scientific and Technical Information Officer
USAFETAC/TS
Scott AFB, IL 62225

1. System would be welcome
2. But if plan is too lofty; won't necessarily find resources to drive it.
3. Don't see requirement out there would justify system.
4. Proprietary ownership a problem in data base.
5. Better; from information standpoint, greatest need is in knowing where to go to get information.

Major Roger C. Whiton
Chief, Environmental Simulation Section
USAFETAC
Scott AFB, IL 62225

Why no Table 3.1 for weather? If you don't provide room for weather-oriented answers, why survey a weather-oriented analysis organization like USAFETAC?

BROOKS AIR FORCE BASE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (OEHL)

Lt. Col. Charles E. Thalken
Chief, Environmental Assessment Branch
Consultant Services Division
USAF OEHL/ECE
Brooks AFB, TX 78235

Computer Needs for Environmental Assessment Branch

To assist this branch in better accomplishing our mission we need to have DOD environmental data placed into a system; then that system needs to be made available for our use. Likewise our consults, reports, projects and etc. need to be placed in a standardized system that could be made available to other DOD users.

The basic problem is there is currently no corporate memory. When an individual leaves all that knowledge references, expertise and files leave with that person and the new individual has to reinvent the wheel.

Captain John L. Ricci
Chief, Ionizine Radiation Services
Radiation Services Division
USAF OEHL/RZI
Brooks AFB, TX 78235

1. The most pressing requirement at this time is to develop a computerized data base consisting of all X-ray survey reports written since 1963. There are approximately 1200 X-ray units and the AF requires surveying every 3 years. The data included in these reports consist of identification type (manufacturer/model/ Serial No.) and radiation safety data (radiation output at various operational settings). These reports must often be accessed to gather information relating to patient exposures. In

addition statistical analyses would be useful to examine trends and X-ray safety throughout the AF. This project would mainly involve data entry and a few programs for retrieval and statistical analysis.

2. We are also in need of computer programs to perform standardized computations such as X-ray shielding design and internal/external exposure to ionizing radiation sources. These calculations are tedious and must be performed by senior level health physicists to insure accuracy. Computer programs would permit a technician to perform the calculations with a final review by a health physicist.

3. We are also in need of a computer program to permit survey into the personnel to enter the data obtained during field surveys into the computer which would then produce a completed report ready for distribution. The program would require some minor computations.

Captain George V. Croshaw
Chief, Nonionizing Radiation Services Branch
Radiation Services Division
USAF OEHL/RZN
Brooks AFB, TX 78235

Our needs are:

1. A data base which includes nominal characteristics of the emissions of nonionizing radiation sources (R-F, lasers).
2. Historical information on all survey data taken in the past.
3. Inventories of these radiation sources at AF bases.
4. The capability to extract this data in multiple formats.

If you can help, great!

Lt. Col. John J. Gokelman
Chief, Data Automation Sucs Divs.
OEHL
Brooks AFB, TX 788235

Would provide data base for Air Force

1. Hazardous waste.
2. Toxicology data base.

Access to model and access to expertise.

Major Dennis F. Naugle
Chief Air Pollution Branch
OEHL/ECA
Brooks AFB, TX 78235

I strongly support a tiered approach for environmental storage, retrieval and analysis.

Tier 1. Would be simple, user-oriented basic information to be used as first-screen techniques. This could be technical reports with charts or nomograms which would give a quick and dirty first fix, a five-minute field solution.

Tier 2. Would be simple general air models which could be quickly accessed by health labl staff without special technical or computer knowledge.

Tier 3. Would be complex models like AQAM which would be used only by research community, highly skilled staff, and only when detail is required.

Major Gary A. Fishburn
Chief Water Quality Branch
OEHL/ECW
Brooks AFB, TX 78325

We need an easier way to move data from the field to a central computer store, perhaps field entry or optical scanning of forms completed in the field. I would be happy to see a central store of NPDES data.

Mr. Thomas C. Thomas
Chief, Environmental Chemistry Branch OEHL/SAN
Brooks AFB, TX 78325

I would like to get away from manual reporting of sample tests and enter the data in the lab directly into an automated system. This would shorten the time taken to complete a test. I would like information on chemical sampling methods used by other agencies including statistical evaluation showing the sampling error rate. I would like toxicological analysis data on strange chemicals which we are unfamiliar with.

EGLIN AIR FORCE BASE
DIRECTORATE OF COMPUTER SCIENCES

Mr. John Carman
Supervisory Mathematician
Directorate of Computer Sciences
AD/KRES
Eglin AFB, FL 32542

I would not like to see a single central facility with a large mainframe located in Washington taking staff positions from the regions. This has been tried before and has failed.

ARPANET and AUTODIN II are candidate networking systems to support environmental information. Don't forget the end user at base or unit level; don't make the system an additional workload for users; serve actual needs.

The key to the system is the data base administration function. This must be assigned at high level to give enough authority. There must be a specific high ranking individual who cracks the whip on data base maintenance. Software is important too but is more a one time deal; good data base maintenance is critical.

The end users should be involved in the creation and development of the system.

Major Larry H. Shingler
Chief Bioenvironmental Engineering
USAF Regional Hospital/SGPE
Eglin AFB, FL 32579

I thought the questionnaire was a relatively good one. There is little more to say except to emphasize several items relevant to this career area.

- We do not have a data processing or analysis responsibility except that which is necessary to accomplish of our mission monitoring environmental quality.

- There are few people in this career area that are familiar with computer technology or the general availability of established data bases or computer models that would be of assistance to accomplishment our mission.

- Many Bioenvironmental Engineering shops will probably be procuring a minicomputer capability within the next few years. In our case, we have elected to go with the larger base computer.

- There is a definite need for an environmental modeling and work management computer system at most Air Force bases. A trial program oriented mostly toward industrial hygiene is now being conducted out of Brooks AFB. (I know you are planning to visit there, so I will not include any further detail.)

RANDOLPH AIR FORCE BASE
HEADQUARTERS AIR TRAINING COMMAND (ATC)

Lt. Colonel Jerry Dantzler
Chief Environmental Planning Division
ATC/DEV
Randolph AFB, TX 78150

The questionnaire is good and covers most of my concerns. We need more regulatory analysis to help with federal and state environmental quality standards. We need automation to help with time-consuming manual tasks, especially environmental assessments but the system must be simple and addressed to present skills; no new personnel should be needed. The environmental programs of several bases need linking at MAJCOM level to increase efficiency and reduce workload.

Major Ron Jones
Command Bioenvironmental Engineer
MAJCOM Surgeons Office
HQ ATC/SGPAP
Randolph AFB, TX 78148

- Many of my thoughts and concerns are mentioned throughout the questionnaire so I won't repeat them.

- I believe the questionnaire successfully covered my areas of concern.

- You'll find that needs in this area at MAJCOM level will vary significantly between MAJCOMS.

- I am very busy just getting my base engineers to develop basic programs let alone use computers and software to help them.

- I believe if the system is available more uses would be found for it.

- I foresee a need for gaining access to environmental laws for various states and for regulations from other services.

- We are on the very edge of computer technology and therefore we don't use them.

Captain Don Bradford
Command Environmental Protection Planner
HQ ATC/DEV
Randolph AFB, TX 78150

An environmental information network is a critical necessity. We lack people, tools and time. We have not time to analyze regulations, key issues or environmental restraints. Our work cries out for a network of this kind. We need a state-of-the-art interactive computer system which can inform us of current environmental regulations and has an up-to-date bibliography on who is doing what, where, a clearing house function. We need gaming capabilities to allow us to play "what if" with different development scenarios and we need carrying capacity analysis. I cannot emphasize too much my support for this idea.

Mr. Quincy Purvis, Comprehensive Planner
Mr. Richard Phillips, Environmental Engineer
Air Base Group
Randolph AFB, TX 78150

We need a legislative index to help us to keep up with relevant regulations and we have problems with NPDES permits because OEHL water sample analysis typically takes four weeks, this is too long because by the time we know that we have a water pollution problem the pollutant has already dispersed.

HEADQUARTERS AIR FORCE SYSTEMS COMMANDS

Michael A. Reed
Energy and Nuclear Effects Division
HQ Air Force Systems Command
HQ AFSC/DLWM
AAFB, Washington, DC 20334

My job is more of a "funnel" between AF needs and the AF labs in R & D. As such I do not directly do any environmental work, but see that environmental issues are addressed and solved.

One of my biggest concerns is that issues that confront the engineer in the field and needed R & D, do not get to the labs or to us involved in R & D at HQ AFSC and the Air Staff.

SAN ANTONIO REAL PROPERTY MAINTENANCE AGENCY (SARPMA)

Sing Nan Chia
Chief, Environmental Engineering Section
SARPMA
P.O. Box 8295
Wainwright Station
San Antonio, TX

Interactive color graphics is an answer to environmental mapping - see Intergraph Corp., Huntsville, AL.

OFFUT AFB, NEBRASKA

Franz E. Westermeier
Chief Climatologist, HQ SAC
3WW/DNC
Offut AFB, NE 68113

I believe this questionnaire does not apply to this office. We are, in effect, Staff Meteorologists to HQ SAC. We do not analyze "raw" weather data nor do we model weather. We do interpret weather statistics, provide advice on the weather environment and act as liaison to USAF ETAC, the organization which provides weather environmental analysis.

Major Frank Bower
Assistant Chief Plans and Policy Operations
Air Force Global Weather Control
AF GWC/DOX
Offut AFB, NE 68113

Global Weather Control would not be a user of an environmental information network but could supply global, real time, or near real time, meteorological data to such a system. Presently Global Weather Control collects global weather data and stores it for 12 hours to 7 days, then passes it via ARPANET to the Environmental Technical Applications Center (ETAC) for archiving and historical analyses. This data transference will soon be via satellite. These data could be made more widely available through an environmental information network.


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